ENVIRONMENTAL ASSESSMENT

CONSTRUCTION OF TWO STERILIZATION FACILITIES, CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND DEACTIVATION OF THE STEAM STERILIZATION PLANT

Prepared for:

United States Army Garrison, Fort Detrick
Frederick, MD 21702

February
1997

FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT

CONSTRUCTION OF TWO STERILIZATION FACILITIES, CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND DEACTIVATION OF THE STEAM STERILIZATION PLANT

AGENCY: United States Army Garrison, Fort Detrick, Frederick, MD

PROPOSED ACTION: The proposed action and subject of this Environmental Assessment (EA) is the modification, reconfiguration, and abandonment of the existing laboratory sewer system (LSS) and steam sterilization plant (SSP) at Fort Detrick, Frederick, Maryland. .The purpose of the proposed action is to improve the efficiency and cost effectiveness of treating the wastes generated by certain biomedical research and development activities at Fort Detrick. The proposed action involves disconnecting the National Cancer Institute (NCI) from the SSP; reconfiguring a portion of the LSS to serve as a sanitary sewer for NCI discharges; constructing two new local sterilization facilities to support the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) and the U.S. Department of Agriculture (USDA) Building 374 greenhouse complex; disinfecting and abandoning the remaining LSS; and deactivating and decontaminating the existing SSP once it is no longer needed. This EA is tiered, in part, to previously prepared documents including the Base Realignment and Closure EA (1996); the U.S. Army Medical Research and Development Command Consolidated Operations Building EA (1993); the Fort Detrick Installation EA (1991); and NCl's environmental documentation to reroute wastewater from NCI buildings to the Fort Detrick sanitary sewer system. This FNSI incorporates the EA by reference.

ALTERNATIVES CONSIDERED: Three reasonable alternatives to the proposed action (Alternative I - the preferred alternative) have been identified: reducing the operations at the SSP by rerouting NCI effluents directly to the sanitary sewer and performing repairs to the system as needed (Alternative II); reducing the operations at the SSP by rerouting NCI wastewater directly into the sanitary sewer, installing double wall pipe with leak detection from USAMRIID and USDA to the SSP, and performing interstitial monitoring of the system (Alternative III); and no action (Alternative IV). The proposed action and alternatives considered were analyzed relative to the condition of the existing system, its expected life span, new technology available, current system users, future mission changes, and the probable and possible environmental impacts of their implementation, including impacts to human health.

ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES: Implementing the proposed action (Alternative I) is not anticipated to result in significant impacts on the environment and will be the most protective of public health, worker health, air quality, and energy resources The three other alternatives assessed involve using the existing LSS-SSP system or require modifications to that system that will not provide leak detection in the LSS to the desired extent or do not provide wastewater treatment as close as reasonably possible to the point of generation.

FACTORS CONSIDERED IN THE FINDING OF NO SIGNIFICANT IMPACT: The EA systematically reviews the nature of the proposed action and associated risks and issues. The proposed action is preferred over the other alternatives as the best alternative to mitigate future potential human health and safety impacts related to the disposal of potentially infectious wastewater from biomedical research activities at Fort Detrick. Feasible alternatives with regard to needs of the United States and the U.S. Army and potential adverse effects on the environment are evaluated.

CONCLUSIONS: The principal conclusions of this EA are that implementing the proposed action would result in no significant adverse environmental impacts and negligible risk to health of the workforce. Implementation of Alternative I would eliminate unnecessary transport of potentially infectious wastewater across Fort Detrick while significantly reducing energy consumption. Alternative I will not cause significant adverse environmental impacts and will result in important benefits to national defense. The other alternatives examined, including the no action alternative, do not sufficiently mitigate potential human health and safety issues associated with the inadequacies in the existing LSS or do not provide treatment of wastewater as close as reasonably possible to the source. Benefits of the proposed action far outweigh the negligible risks.

COMMANDER:

HENRY O. TUELL, III
Colonel, MS
Commander, USAG
Fort Detrick, MD

5 Feb 97
Date

DEPARTMENT OF THE ARMY
U.S. Army Garrison (USAG)
Fort Detrick, MD 21702

ENVIRONMENTAL ASSESSMENT

Construction of Two Sterilization Facilities, Conversion and Abandonment of the Laboratory Sewer System, and Deactivation of the Steam Sterilization Plant

Prepared by:
U.S. Army Garrison

February 1997

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FINAL ENVIRONMENTAL ASSESSMENT

CONSTRUCTION OF TWO STERILIZATION FACILITIES, CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND DEACTIVATION OF THE STEAM STERILIZATION PLANT

Prepared for:

United States Army Garrison, Fort Detrick
Frederick, MD 21702

February 1997

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ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION OF TWO STERILIZATION FACILITIES, CONVERSION AND ABANDONMENT OF THE laboratory SEWER SYSTEM, AND DEACTIVATION OF THE STEAM STERILIZATION PLANT UNITED STATES ARMY GARRISON, FORT DETRICK, MARYLAND

EXECUTIVE SUMMARY

The proposed action (Alternative I) of this Environmental Assessment (EA) is the modification, reconfiguration, and abandonment of the existing laboratory sewer system (LSS) and the steam sterilization plant (SSP) at Fort Detrick, Maryland. The proposed action involves disconnecting the National Cancer Institute (NCI) from the steam sterilization facilities, constructing two new local sterilization facilities to support the United States Army Medical Research Institute of Infectious Diseases **(USAMRIID) and the U.S.** Department of Agriculture (USDA) Building 374 greenhouse complex, reconfiguring a portion of the LSS to a sanitary sewer for NCI discharges, disinfecting and abandoning the remaining LSS, and deactivating and decontaminating the existing SSP. The proposed action entails deactivating the existing SSP and constructing two new sterilization facilities to treat wastewater requiring more treatment than provided by the sanitary sewage treatment plant.: Some wastewater, which does not require treatment greater than what is provided at the wastewater treatment plant (WWTP), may also be treated at the new sterilization facilities due to physical difficulty in separating the waste streams, or at the discretion of USDA or USAMRIID. The proposed action would continue to support biomedical research and development activities at Fort Detrick in the safest, most dependable, and the most cost effective manner.

Three reasonable alternatives to the proposed action have been identified: (1) reducing the operations at the SSP by rerouting NCI effluents directly to the sanitary sewer and performing repairs to the system as needed (Alternative II); (2) reducing the operations at the SSP by rerouting NCI wastewater directly into the sanitary sewer, installing double wall pipe with leak detection from USAMRIID and USDA to the SSP, and performing interstitial monitoring of the system (Alternative III);); and (3) no action (Alternative IV). The proposed action and alternatives considered were analyzed relative to the condition of the existing system, its expected life span, new technology available, current users of the system, future mission changes, and the probable and possible environmental impacts of their implementation, including impacts to human health.

This EA was prepared in accordance with guidance provided in Army Regulation (AR) 200-2, *Environmental Effects of Army Actions,* dated December 23, 1988, implementing the *National Environmental Policy Act* (NEPA) (42 USC 43214347). Activities associated with the proposed modification, reconfiguration, and abandonment of the Fort Detrick LSS-SSP system were systematically reviewed. Particular attention was given to accident and emergency procedures and to potential beneficial and adverse impacts of improving the treatment of potentially infectious wastewater. The proposed action was examined within the context of the surrounding physical, biological, and socioeconomic environment. Reasonable alternatives to the proposed action were examined with regards to the needs and mission of the Army.

ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION OF TWO STERILIZATION FACILITIES, CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND DEACTIVATION OF THE STEAM STERILIZATION PLANT UNITED STATES ARMY GARRISON, FORT DETRICK, MARYLAND

The principal conclusions of this EA are (1) deactivation of the LSS-SSP system, construction of two new local treatment facilities for USAMRIID and USDA, and rerouting NCI wastewater to the sanitary sewer system (Alternative I, the preferred alternative) would not cause significant adverse environmental impacts on the surrounding environment, would be the most protective of the health of the public and the workforce, would be energy efficient, and would improve the air quality of Fort Detrick; (2) the three other alternatives assessed all include use of the existing LSS- system or modifications to that system that do not adequately provide for leak detection in the LSS or sufficiently address the issue of transporting potentially infectious wastewater across the Installation; and (3) the proposed action is the best alternative to mitigate future potential human health impacts related to disposal of potentially infectious wastewater from biomedical research activities at this location and is the best alternative to fulfill the mission of Fort Detrick.

ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION OF TWO STERILIZATION FACILITIES, CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND DEACTIVATION OF THE STEAM STERILIZATION PLANT
UNITED STATES ARMY GARRISON, FORT DETRICK, MARYLAND

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CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND
DEACTIVATION OF THE STEAM STERILIZATION PLANT
UNITED STATES ARMY GARRISON, FORT DETRICK, MARYLAND

1.0 Purpose & Need for the Proposed Action

The proposed action and subject of this EA are the modification, reconfiguration, and abandonment of the existing laboratory sewer and steam sterilization facilities at Fort Detrick, Maryland. The proposed action entails disconnecting NCI from the steam sterilization facilities, reconfiguration of a portion of the LSS to a sanitary sewer, construction of two new local sterilization facilities to support USAMRIID and USDA Building 374 greenhouse complex, disinfection and partial abandonment of the LSS, and deactivation and decontamination of the SSP. The primary intent of the proposed action is to deactivate the SSP, discharge the majority of the wastewater currently being treated but not requiring treatment at the SSP directly into the sanitary sewer, and the construction of two new treatment facilities for those operations that require wastewater treatment over and above the treatment provided by the sanitary sewage treatment plant. Implementation of the proposed action would reduce the repetitive treatment of wastes that do not require the rigorous treatment provided by the SSP (i.e., sanitary sewage). This EA examines the extent and significance of potential environmental impacts resulting from the modification, reconfiguration, and abandonment of the LSS-SSP system and the potential adverse human health risks associated with the disinfection and abandonment of potentially contaminated pipes, deactivation of the steam sterilization equipment, and the disposal of etiologic agents from laboratory operations.

The LSS-SSP system was constructed in stages over a period of more than 20 years. Construction activities from 1949 to 1969 were in support of the U.S. Army's biological offensive warfare research, development, and production program, whereas extensions and/or modifications to the LSS that took place between 1969 and 1972, supported biomedical research activities. This system was designed for the treatment of large quantities of biological wastes produced by former Army biological warfare laboratories at Fort Detrick. Potentially infectious wastewater was decontaminated or sterilized in the laboratories before discharge into the LSS, which transported the waste to the SSP for sterilization. The offensive biological warfare research program was discontinued in 1969. As a requirement of demilitarization of the offensive biological warfare effort, the laboratories and sewer lines were then chemically disinfected. In 1972, a new cancer research mission was established at Fort Detrick (Covert, 1994). As cancer research activities began at Fort Detrick, some of the biological warfare research facilities were converted to administrative uses while others were modernized and utilized for biomedical research. Former biological warfare research facilities converted to other research missions and administrative purposes discharged wastewater into the special sewer system (i.e., the LSS). Today, the LSS-SSP system is used to treat wastewater originating from laboratories classified as biosafety levels (BL) 1 through 4 as well as some sanitary sewage from former biological warfare research facilities which have been converted to non-laboratory space. The quantities of wastes currently transported and treated through the LSS-SSP system are much smaller than quantities processed during the conduct of the biological warfare research program. USAMRIID, the USDA Building 374 greenhouse complex, and NCI are the major contributors to this system (RASco, Inc., 1996; Sheffer, 1996a).

ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION OF TWO STERILIZATION FACILITIES,
CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND
DEACTIVATION OF THE STEAM STERILIZATION PLANT
UNITED STATES ARMY GARRISON, FORT DETRICK,

This EA describes the potential adverse environmental impacts, including human health impacts, associated with implementation of the proposed action and the three alternatives to the proposed action. The EA also characterizes the environment that is potentially affected by the proposed action. This analysis considers impacts that are expected to result from the modification, reconfiguration, and abandonment of the LSS-SSP system including adverse environmental and human health impacts, cumulative impacts that might occur after several years, and in conjunction with impacts associated with other activities in the area, and as a result of an accident or incident.

Pursuant to NEPA (42 USC 4321-4347), each federal agency must give appropriate consideration to the potential environmental impacts associated with its proposed major actors. The Council on Environmental Quality (CEQ), Executive Office of the President, has promulgated regulations implementing NEPA (40 Code of Federal Regulations (CFR) Parts 1500-1508). AR 200-2, *Environmental Effects of Army Actions*, dated December 23, 1988 (32 CFR 651), is the Department of the Army's (DA) implementation of NEPA and the CEQ regulations.

To reduce redundancy with previous relevant documents as required by the CEQ (40-CFR, Parts 1500-1508), this EA is tiered, in part, to earlier NEPA documentation. This approach entails referencing specific analyses, discussions, and conclusions of these documents without providing detailed discussion in the present EA. Consistent with CEQ guidance and DA policy (AR 200-2, paragraph 2-6e) the EA is tiered to the *Installation Environmental Assessment, Fort Detrick, Frederick, Maryland* (Installation EA) (Advanced Sciences, Inc., 1991), the U.S. *Army Medical Research and Development Command Consolidated Operations Building Environmental Assessment, Fort Detrick, Frederick, Maryland* (COB EA) (Telemarc, Inc., 1993a), the *Department of Defense Vaccine Production Facility Environmental Planning Guide (VPF* EPG), *Fort Detrick, Frederick, Maryland* (Telemarc, Inc., 1993b), the *Realignment/Construction Environmental Assessment, Fort Detrick, Mary/and* (BRAC EA) (U.S. Army Corps of Engineers (USACOE), 1996), the *Foundation of the Fort Detrick Drinking Water System Environmental Assessment Fort DETRICK Frederick, Maryland* (Fluoride EA) (Beaver Schaberg Associates, Inc., 1996); and NCl's environmental documentation to reroute wastewater from NCI buildings to the Fort Detrick sanitary sewer system (see Appendix A).

2.0 Description of the Proposed Action

2.1 INTRODUCTION

The proposed action described here is the modification, reconfiguration, and abandonment of the existing laboratory sewer and steam sterilization facilities at Fort Detrick. The purpose of the proposed action is to reduce unnecessary treatment of some wastewater by deactivating the SSP, discharging much of the wastewater currently treated at the SSP directly to the sanitary sewer, and constructing two new treatment facilities for those research operations that require additional treatment of wastewater.

2.2 LOCATION & FACILITIES

Fort Detrick is located in central Maryland. The Installation encompasses 1,230 acres divided into three separate parcels of land identified as Areas A, B and C. The general location and a more detailed description of Fort Detrick are provided in Section 4.0.

Fort Detrick is a U.S. Army Installation which currently supports 25 onsite tenant organizations. The U.S. Army Garrison (USAG) is responsible for providing daily operations support and infrastructure for the tenants at Fort Detrick (Figure 2-1). Support services and operations at Fort Detrick are primarily the responsibility of the Directorate of Installation Services (DIS) and the Directorate of Safety and Environment (DSE). Interservice Support Agreements (ISSA) between tenants and the USAG provide the basis for the support services required by individual tenants. Responsibilities of the DIS include overall facility and infrastructure planning, construction maintenance, and operation, including liquid and solid waste management. The DSE ensures that all federal, state, local, Army and Installation regulations and policies concerning health and safety are complied with and that necessary permits are obtained. The DSE also coordinates the use, handling, and disposal of hazardous materials. Buildings on the Installation are managed by DIS with the exception of NCI.

The NCI, Frederick Cancer Research and Development Center (FCRDC), a legally separate entity, owns and occupies approximately 70 acres and over 80 buildings of Area A. The NCI acquired the land and former biological warfare research buildings in 1972. Many of these buildings are connected to the LSS-SSP system. The USAG has no jurisdiction over NCI, however, USAG provides NCI with the necessary utilities (e.g., sewer, water, etc.) through an Interagency Support Agreement. The NCI has no responsibility for operations and maintenance of these utilities outside the confines of their buildings (Advanced Sciences, Inc., 1991; Covert, 1996).

2.3 WASTES REQUIRING TREATMENT

Laboratories involved in research, education, and clinical and diagnostic procedures pose varying degrees of risk depending upon the etiologic agents and activities in operation. The basic elements of containment facilities are laboratory practices and techniques, safety equipment, and facility design. Each biosafety level is a

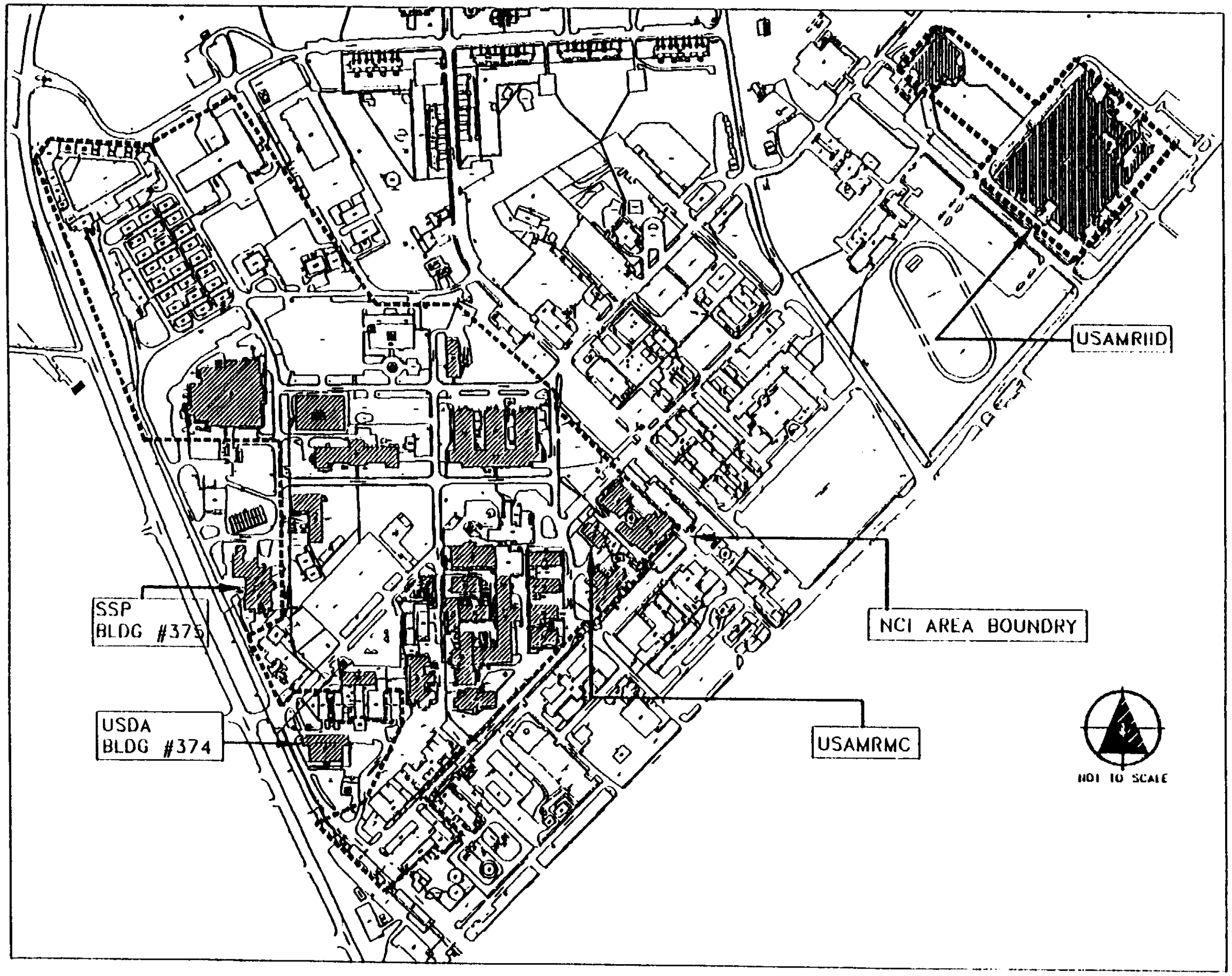

FIGURE 2-1 Map of Area A with NCI, USDA, and USAMRIID

combination of these elements specifically appropriate for the operations performed, the known or suspected routes of transmission of the etiologic agents, and the function of the laboratory necessary to protect laboratory workers, the public, and the environment. The degree of risk dictates the BL requirements necessary for protection. Biosafety levels are designated in ascending order, by degree of protection provided to workers, the public, and the environment. The lowest level is a BL-1 laboratory which is suitable for work involving well-characterized agents not known to cause disease in healthy adult humans, with minimal risk to the laboratory worker and the environment. Biosafety level 1 laboratories require relatively few safety precautions. A BL-4 laboratory requires the strictest level of safety precautions because it involves work with dangerous and exotic agents which pose a high individual risk of aerosol- laboratory infections and life-threatening disease (Centers for Disease Control and Prevention & National Institutes of Health (CDC/NIH), 1993). USAMRIID is the only tenant at Fort Detrick that currently operates BL-4 laboratories.

Biosafety level 4 laboratories are required to decontaminate liquid wastes from laboratory sinks, biological safety cabinets, floor drains, and autoclaves by heat treatment prior to discharge into the sanitary sewer system in accordance with 32 CFR 627.46, DA Pamphlet (PAM) 385-69, and CDC/NIH guidelines. Further, liquid drains shall be connected directly to a liquid waste decontamination system such as the LSS. Wastes from shower rooms and toilets must also be decontaminated by heat or chemical disinfection prior to discharge according to 32 CFR 627.46 and DA PAM 385-69. USAMRIID Regulation 385-6 requires that BL-4 wastes must be autoclaved twice. Therefore, USAMRIID effluents from BL-4 laboratories must also be sterilized at a facility such as the SSP. USAG policy requires that all potentially infectious sewage from BL-4 areas be collected by the LSS and therefore treated at the SSP. The LSS provides the required collection and additional treatment of BL-4 wastewater. These requirements apply only to BL-4 wastes, not wastes generated from BL-3, BL-2, or BL-1 activities (Sheffer, 1996a). However, wastewater from non BL-4 USAMRIID sources may also be treated at the SSP at the discretion of the USAMRIID Commander. The NCI-FCRDC has no regulatory requirement for the LSS-SSP (DA, 1996).

According to USAG and NCI policy, all potentially infectious liquids are decontaminated prior to disposal to the sanitary sewer (RASco, Inc., 1996; Sheffer, 1996a). Therefore, the LSS-SSP system serves only as back-up treatment for BL-2 and BL-3 laboratories, except for the USDA Building 374 greenhouse complex. The SSP (or an alternative treatment facility) is required for Building 374 because the SSP provides primary wastewater treatment for this facility. Further, the use of imported species at USDA requires additional treatment of wastewater such as that provided by the SSP (DA, 1996). Wastes originating from BL-1 activities do not require decontamination. USAG policy also permits drains from air conditioning units and cooling towers to discharge into the LSS or the sanitary sewer. Wastewater originating from sources other than BL- facilities (e.g., BL-1, BL-2, or BL-3 laboratories and sanitary sewage) may be discharged into the LSS on the basis of engineering considerations of convenience and cost (Sheffer, 1996a). Further, the recommendations from the Bio-Assessment

Advisory Group (BAG) are based on several factors: 1) USDA Building 374 requires the treatment provided by the LSS-SSP system because it provides primary treatment for their wastes; 2) wastes generated by BL-4 operations at USAMRIID require the secondary heat treatment at the SSP prior to entering the sanitary sewer; 3) there is no regulatory requirement for secondary heat treatment of NCI wastes, therefore, NCI does not require the treatment provided by the LSS-SSP system; and 4) treatment for potentially infectious wastewater should be provided as close to the source as possible (DA, 1996). For more details regarding treatment of wastes see Appendix B.

2.4 HISTORY OF THE LSS-SSP

The biological warfare research effort was established at Fort Detrick in 1943 (Covert, 1994). As a part of this effort, large quantities of biological agents were produced. The LSS and the SSP were dedicated to collect, transport, and treat potentially infectious wastewater produced by research and production activities in the laboratories (RASco, Inc., 1996). In 1969, President Richard M. Nixon signed an Executive Order outlawing offensive biological warfare research in the United States. Therefore, biological research activities were to be limited to defensive measures. The former biological warfare laboratories were decommissioned and disinfected between 1969 and 1973 as a part of the demilitarization effort. On October 19, 1971, the FCRDC of the NCI was designated as the leading facility in the fight against cancer. The new center used the former Army biological warfare buildings at Fort Detrick and was also in close proximity to the NIH in Bethesda, Maryland. In 1972, the Army Medical Unit (USAMU) was designated USAMRIID under the management of The Surgeon General of the Army and the U.S. Army Medical Research and Materiel Command (USAMRMC). As a result of the demilitarization effort at Fort Detrick, several new organizations including the Defense Medical Standardization Board (DMSB), the U.S. Army Medical Materiel Agency (USAMMA), and the USDA also began operations at Fort Detrick (Covert, 1994). These organizations also began utilizing the former biological warfare research laboratories for research and administrative purposes.

The LSS-SSP system was originally created to fulfill the need to transport and treat potentially infectious wastewater resulting from the biological warfare effort. The LSS was constructed in stages between 1949 and 1972. There are approximately 20,000 feet of underground LSS mains ranging in diameter from 2 inches to 12 inches. The majority of the LSS pipes are constructed of cast iron pipe encased in a minimum of 6 inches of unreinforced concrete. The LSS lines discharge wastewater to the SSP via gravity flow. Access to the LSS is through indoor floor drains, approximately 125 cleanouts, vent pipes located on building roofs, and at one known location where the LSS passes through a concrete manhole. The SSP was originally constructed in 1953 and was expanded in 1957 (Sheffer, 1996a). For more detailed information regarding the history of the LSS-SSP system see Appendix C.

2.5 THE EXISTING LSS-SSP SYSTEM

2.5. Current Volumes Processed by the LSS-SSP System

The SSP was designed to treat a capacity of 1.15 million gallons per day (mgd). However, quantities of wastes treated currently are much smaller. Daily wastewater flows to the SSP in 1994 averaged 0.24 mgd and varied from 0.17 mgd (February) to 0.39 mgd (August). The high variability of monthly flows can most likely be attributed to air conditioning condensate and cooling water. Under normal conditions, air conditioning condensate, and cooling water do not require treatment at the SSP, however, if they come in contact with air from containment areas of laboratories they must be processed through the LSS-SSP system. Current documented wastewater influent to the LSS-SSP system originates from laboratories classified as BL-1 through 4 as well as some sanitary sewage. The sanitary sewage in the LSS is from former biological warfare research facilities which have been converted for use as non- space. Current procedures at all laboratories on Fort Detrick, except for USDA Building 374, require sterilization or inactivation of all infectious material and toxins from BL-3 and BL-4 facilities before release into the LSS-SSP system. USDA Building 374 operates a BL-3 agriculture laboratory that is allowed to discharge wastewater directly from containment areas to the LSS without treatment because the bacteria, fungi, and viruses in use at this facility do not present a risk to human health. The Nuclear Regulatory Commission (NRC) does not permit radioactive materials to be discharged into the LSS. In addition, hazardous laboratory wastes, such as organic solvents and chemicals that are toxic, carcinogenic, corrosive, ignitable, or reactive are not discharged into the LSS. Although all influent to the SSP is considered potentially infectious, the majority of wastewater currently processed by the LSS-SSP system is sanitary sewage or wastewater which does not require the rigorous treatment provided by the SSP.

The Fort Detrick tenants and other government activities who discharge the majority of wastewater into the system are NCI, USDA, and USAMRIID. Biological/materials in use at these facilities include fungi, bacteria, and viruses studied at USDA, NCI, and USAMRIID. USAMRIID is the only facility at Fort Detrick that operates BL-4 laboratories. The USDA Building 374 greenhouse complex operates a BL-3 agriculture laboratory and the highest level of containment that NCI operates is BL-3. All of the tenants and/or sources combined account for an estimated 124,900 gallons per day (gpd) (i.e., 0.12 mgd Analysis of LSS flows identified that only approximately 52% of the flows could be accounted for, with NCI as the single largest wastewater generator contributing 60% of the LSS flow (Table 2-1). It is uncertain where the other 48% of wastewater treated at the SSP originates. The incinerator accounts for an insignificant amount of flow at 2.5 gpd. In addition, rainwater that collects in the aboveground storage tank containment area is pumped into the tanks and treated at the SSP. It is estimated that this additional influent accounts for 200,000 gallons per year. Other potential sources include air conditioning condensate, cooling water, undocumented sanitary wastewater, the sump pump in the basement of the SSP which pumps an unknown quantity of groundwater into the system, and other various unidentified sources of flow (RASco, Inc., 1996; Sheffer, 1996a) (see Appendix D and Appendix E).

TABLE 2-1 Estimated Average Daily Flows to the LSS-SSP System by Known Source

Source	Estimated Average Daily Flow[1]	Percent of Flow
USAMRIID	45,000	36.0%
USDA	4,500	3.6%
Incinerator	2.5	< 0.1%
USAMRMC (Building 524)	850	0.7%
NCI	74,000	60.0%
Rainfall	548	0.4%
Total	**124,900**	**100.7%**

[1] Data in gallons per day (gpd).
(Data complied from Sheffer, 1996a)

2.5.2 Routine Operations & Maintenance

Operations at the SSP (Building 375) began in 1958. The SSP currently operates on a 24 hours a day basis at about 20% capacity. Wastewater is collected from the buildings and transported to the SSP via the LSS gravity flow system. Upon reaching the SSP, influent flows by gravity down through eight comminutors (grinders) into six 50,000-gallon holding tanks in the basement of the SSP. The wastewater is then pumped into nine 50,000-gallon aboveground holding tanks for storage until treatment. The exterior aboveground storage tanks are situated within a concrete basin for spill protection. Wastewater then flows back to the SSP via gravity where it is pumped through heat exchangers into the steam sterilization units. The SSP consists of four 200 gallon per minute (gpm) independent sterilization units composed of heat exchangers and steam injectors. Typically, one sterilization unit is treating influent, two are operational but not in use, and one is shut down for repairs and maintenance. Each steam sterilizer contains a heat retention tube component which is equipped with a steam injector. The retention tubes hold the liquid to be decontaminated for a time and temperature sufficient to kill any organism contained in the liquid. The function of the steam injector is to sterilize the wastewater by injecting the proper amount of steam into the wastewater to maintain a temperature of 270°F for a minimum of 11 minutes. The amount of steam required, usually 20 - 100 pounds per square inch, is based on the rate of wastewater flow. Upon exiting the heat retention tubes, the wastewater is again passed through the heat exchangers. The function of the heat exchangers is to both heat the wastewater prior to being sterilized, and to cool the wastewater after sterilization and prior to discharge to the sanitary sewer. SSP effluent is then discharged into the Fort Detrick sanitary sewer at a temperature between 110°F and 135°F and transported to the Fort Detrick WWTP located in Area C (RASco, Inc., 1996; Sheffer, 1996a). For more details on the operation and maintenance of the LSS-SSP system see Appendix D and Appendix F.

The WWTP discharges to the Monocacy River under National Pollutant Discharge Elimination System (NPDES) Permit No. MD0020877, which allows the discharge of a maximum of 1.2 mgd of wastewater. Special limitations for the effluent from Fort Detrick's WWTP are provided in Table 2-2. In addition to flow volume limitations, effluent characteristics are limited on a concentration and total loading basis (specifically biological oxygen demand - 5 days (BOD_5), suspended solids, and total Kjeldahl nitrogen). The NPDES permit also provides for a maximum in fecal coliform bacteria, a minimum concentration of dissolved oxygen, and a restricted range of pH values (Code of Maryland Regulations (COMAR) 26.08.03; COMAR 26.08.04).

TABLE 2-2 Effluent Limitations Associated with the Fort Detrick's Wastewater Treatment Plant NPDES Permit

Effluent Characteristics	Monthly Loading Rate (kg/day)	Weekly Loading Rate (kg/day)	Monthly Average (mg/L)	Weekly Average (mg/L)
BOD_5	45	68	10	15
Suspended solids	45	68	10	15
Total Kjeldahl nitrogen (April 1 to Sept. 30)	27	40	6.0	9.0

Effluent Characteristics	Maximum	Minimum
Fecal Coliforms	200 most probable number (MPN)/100 mL monthly log mean value	N/A
Total residual chlorine	below detection level	N/A
Dissolved oxygen	N/A	5.0 mg/L at any time
pH	8.5	6.5
Flow	1.20 mgd	N/A

(Taken from Telemarc, Inc., 1993b)

2.5.3 Monitoring

A number of studies and investigations to determine the condition of the LSS, and the environmental impacts from the LSS have been conducted. In 1994, a study was conducted by a consultant, Hydro Geo Chem, Inc., to assess the condition of the LSS. A gas was injected into the LSS, and then the soil adjacent to the LSS was measured for the presence of the gas. The results of the Hydro Geo Chem, Inc. study are provided in Appendix G. In March of 1995, two sections of the LSS were excavated, inspected, tested, and repaired. Details of these actions are provided in Appendix H. In 1995, the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) began an evaluation of the health risks to employees and the public if the LSS system is continued to be used in its current condition. Information on the evaluation is provided in Appendix I. Routine monitoring of the SSP system entails testing for *Escherichia cold* in the SSP effluent every 8 hours (Sheffer, 1996a).

2.5.4 Waste Management

All wastewater generated by the operation of the LSS-SSP is disposed of through the sanitary sewer system to the Fort Detrick WWTP. The primary waste that is generated by this system is potentially infectious steam which results from steam being injected into the LSS wastewater. After injection, the steam is processed through the SSP and becomes a part of the SSP effluent.

2.6 MODIFICATION, RECONFIGURATION, & ABANDONMENT OF THE LSS-SSP SYSTEM

The proposed action is the modification, reconfiguration, and abandonment of the existing laboratory sewer and steam sterilization facilities at Fort Detrick. When fully implemented, the configuration of the LSS-SSP system would be as illustrated in Figure 2-2.

2.6.1 Disconnect NCI Facilities from the Steam Sterilization Facilities

Wastewater originating from NCI facilities does not require the additional treatment provided at the SSP. All potentially infectious wastewater is autoclaved or chemically disinfected in accordance with (or exceeding) CDC/NIH biosafety guidelines and Maryland Department of the Environment (MDE) regulations prior to discharge into the sewer system (DA, 1996). Treatment at the SSP is not needed for NCI to meet these requirements. To reduce the excessive costs associated with redundant treatment, the proposed action calls for NCI to be disconnected from the LSS-SSP system Disconnecting NCI involves rerouting all wastewater from NCI, which was previously discharging into the LSS, to the sanitary sewer. This would be achieved by reconfiguring the LSS in the vicinity of NCI buildings by disconnecting NCI effluent pipes from the LSS and reconnecting them to the sanitary sewer. LSS lines which are converted to sanitary sewer lines will be decontaminated before the reconfiguration is complete. NCI facilities would then discharge wastewater directly into the sanitary sewer system and receive the necessary treatment at the Fort Detrick WWTP (RASco, Inc., 1 996) All pathogens, including all biohazardous waste materials originating from NCI BL-2 and BL-3 laboratories, would continue to be subject to autoclave sterilization prior to discharge. It is estimated that disconnecting NCI from the LSS would take 9 months to 1 year. The estimated cost associated with disconnecting NCI from LSS is $615,000 (Sheffer, 1996a). NCl's evaluation of the impacts of their disconnection from the LSS is provided in the NCI Categorical Exclusions (CX) in Appendix A.

2.6.2 Reconfiguration of a Portion of the LSS to a Sanitary Sewer

To transport wastewater originating from NCI to the sanitary sewer system, portions of the LSS which currently service NCI buildings would be reconfigured to become part of the sanitary sewer. Prior to the modification, these LSS lines would be

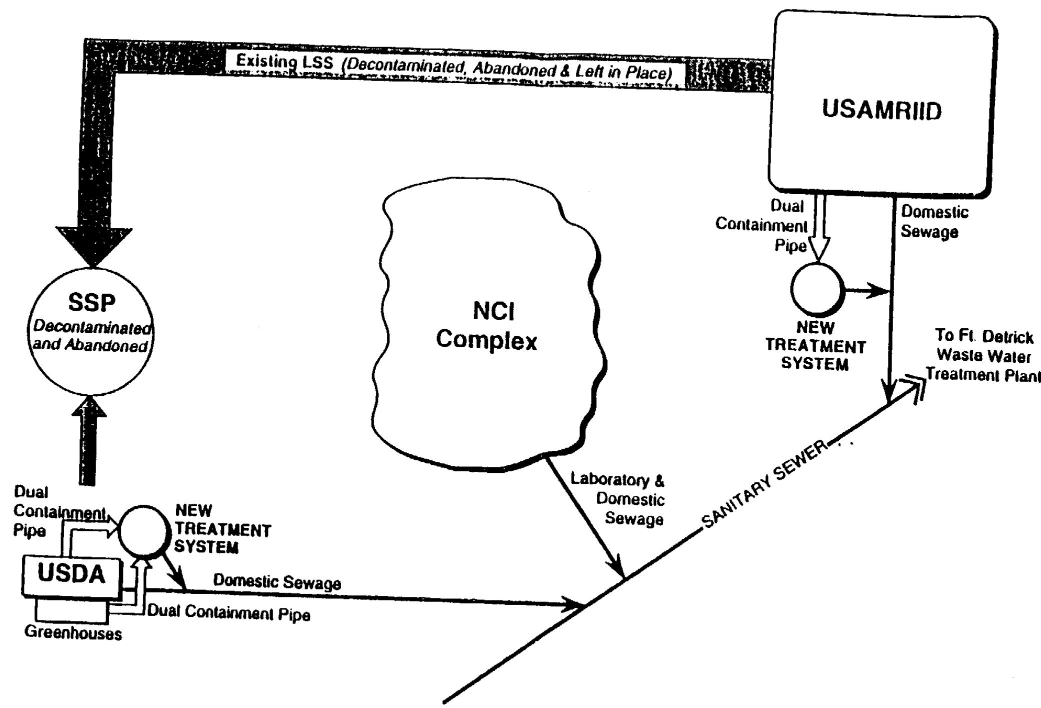

FIGURE 2-2 Schematic representation of Alternative I (the Preferred Alternative)

(Taken and modified from RASco, Inc., 1996)

decontaminated. The decontaminated sections of the LSS would no longer be treated or monitored as an LSS, rather they would be subject to normal operations and maintenance procedures associated with the sanitary sewer system (RASco, Inc. 1996). For more detailed information regarding excavation and tie-in to LSS sewer lines see Appendix J.

2.6.3 Construction of Two New Sterilization Facilities

Operations currently performed at the SSP would be replaced by two new local sterilization facilities. There are several reasons for the construction of two new treatment facilities. USAMRIID and USDA have the only facilities currently operated at Fort Detrick that require additional treatment before discharge into the sanitary sewer in accordance with DA PAM 385-69 and 32 CFR 626, wastewater effluent originating from BL-4 laboratories at USAMRIID requires secondary heat treatment prior to discharge into the sanitary sewer (DA, 1996). The use of imported species at USDA requires additional treatment. The SSP currently provides primary treatment for effluent from the USDA laboratories and greenhouse. The treatment provided by the SSP for wastewater originating from Building 374 satisfies the proposed Animal and Plant Health Inspection Service (APHIS) regulation (DA, 1996). An additional reason for the construction of new local facilities is because potentially infectious wastewater currently generated by USAMRIID must travel across the Installation before receiving secondary treatment at the SSP. The construction of two new local sterilization facilities would move the treatment processes much closer to the source which would minimize potential risk and reduce repair and maintenance. The new treatment facilities would also utilize the latest technology and equipment for the sterilization of potentially infectious wastewater.

Fort Detrick maintains an Installation Master Plan in accordance with AR 210-20 to address such areas of concern as environmental protection, land use, transportation, utilities, natural resources, and fire/safety issues. Sites for construction at Fort Detrick are selected in accordance with the Future Development Land Use Plan. The exact location of the two new treatment facilities would be approved of by the Fort Detrick Installation Planning Board (IPB). Both facilities would be located in Area A-of Fort Detrick, the most extensively developed area of the Installation (Telemarc, Inc., 1993a). Although the engineering and design details have not yet been finalized, some general information regarding the new sterilization facilities is provided below.

2.6.3.1 USAMRIID

One treatment facility would be located in close proximity to USAMRIID to treat wastewater generated by BL-1 through BL-4 activities in Building 1425 and Building 1412 (Figure 2-3). All wastewater generated by BL-4 activities at USAMRIID would be treated at the new local sterilization facility. Wastewater from non-BL-4 facilities may also be treated at the new facility at the discretion of the Commander of USAMRIID. Therefore, some wastewater from non BL-4 sources may also be treated by this new facility. The treatment capacity for the new USAMRIID facility would be determined at a later date. However, the estimated quantity of wastewater that will be treated at the

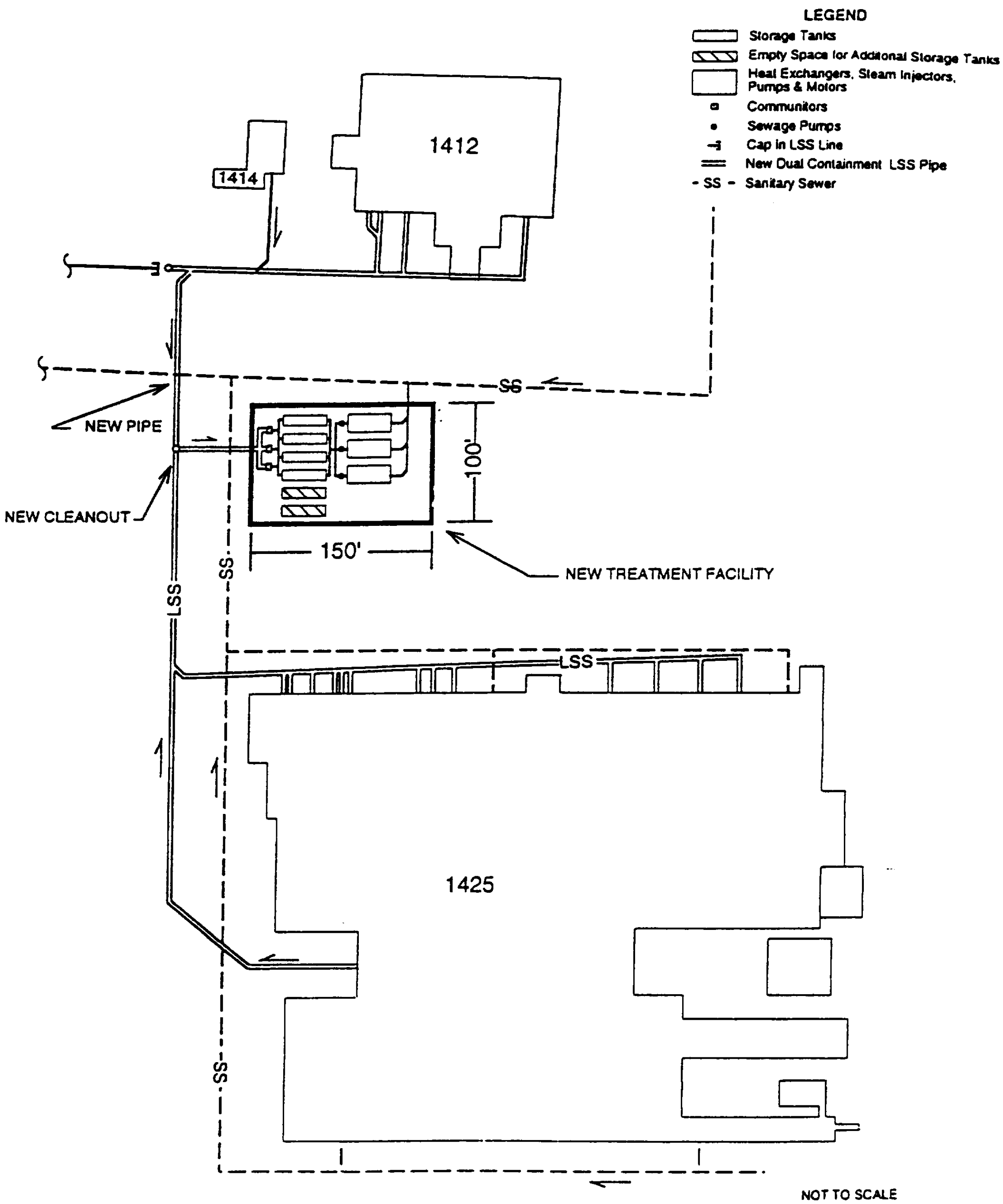

Figure 2-3. A Potential Location for the New USAMRIID Treatment Facility
(Taken and modified from RASco, Inc., 1996)

new facility is less than 50,000 gpd. This facility may also utilize underground storage tanks for wastewater. Effluents from USAMRIID would be transported to the new steam sterilization facility via double wall pipes with interstitial leak detection. Wastewater effluent from the new treatment plant would be discharged directly into the sanitary sewer. Adequate safety features would also be incorporated into the design of the treatment facility to ensure that no wastewater is discharged to the sanitary sewer without first receiving treatment. Final treatment of the wastewater would occur at the Fort Detrick WWTP (RASco, Inc., 1996).

2.6.3.2 USDA

The second sterilization facility would be located in the vicinity of the USDA contained greenhouse complex (Building 374) (Figure 24). This facility would be designed to treat wastewater from the USDA BL-3 agriculture laboratory and the greenhouse. The new local sterilization facility is necessary to provide primary treatment for wastewater from the USDA Building 374 greenhouse complex. Unlike other BL-3 laboratories at Fort Detrick, USDA is not required to sterilize or deactivate BL-3 wastewater from this facility prior to discharge because the bacteria, fungi, and viruses in use present only an economic risk to agriculture, not a risk to human health (DA, 1996). Wastewater effluents from USDA Building 374 would be transported to the new treatment facility through double wall pipe. The maximum treatment capacity of the new USDA sterilization facility is yet to be determined. This facility would treat all BL-3 and greenhouse wastewater from the USDA Building 374 greenhouse complex and may provide extra capacity for growth and future mission changes. The estimated quantity to be treated at the new facility is less than 5,000 gpd. Following sterilization, wastewater would discharge through the sanitary sewer system where it would then be pumped to the WWTP for final treatment and discharge into the Monocacy River (RASco, Inc., 1996). Adequate safety features would be included in the design of the facility to ensure that all wastewater is treated prior to discharge into the sanitary sewer (Sheffer, 1996b).

2.6.4 Disinfection & Abandonment of the Remaining LSS

Portions of the LSS in the vicinity of NCI buildings would be converted to perform as a sanitary sewer in order to discharge NCI effluents directly into the sanitary sewer system. That portion of the LSS that is not converted to perform as a sanitary sewer for NCI discharges would be disinfected and abandoned. Decontamination procedures would minimize the impacts to the sanitary sewage treatment plant and would ensure that the WWTP remains within their discharge permit limits. Decontamination would most likely be accomplished with the use of either sodium hypochlorite, Clorox®, or steam. The decontaminated LSS would then be abandoned and left in place (RASco, Inc., 1996; Sheffer, 1996b).

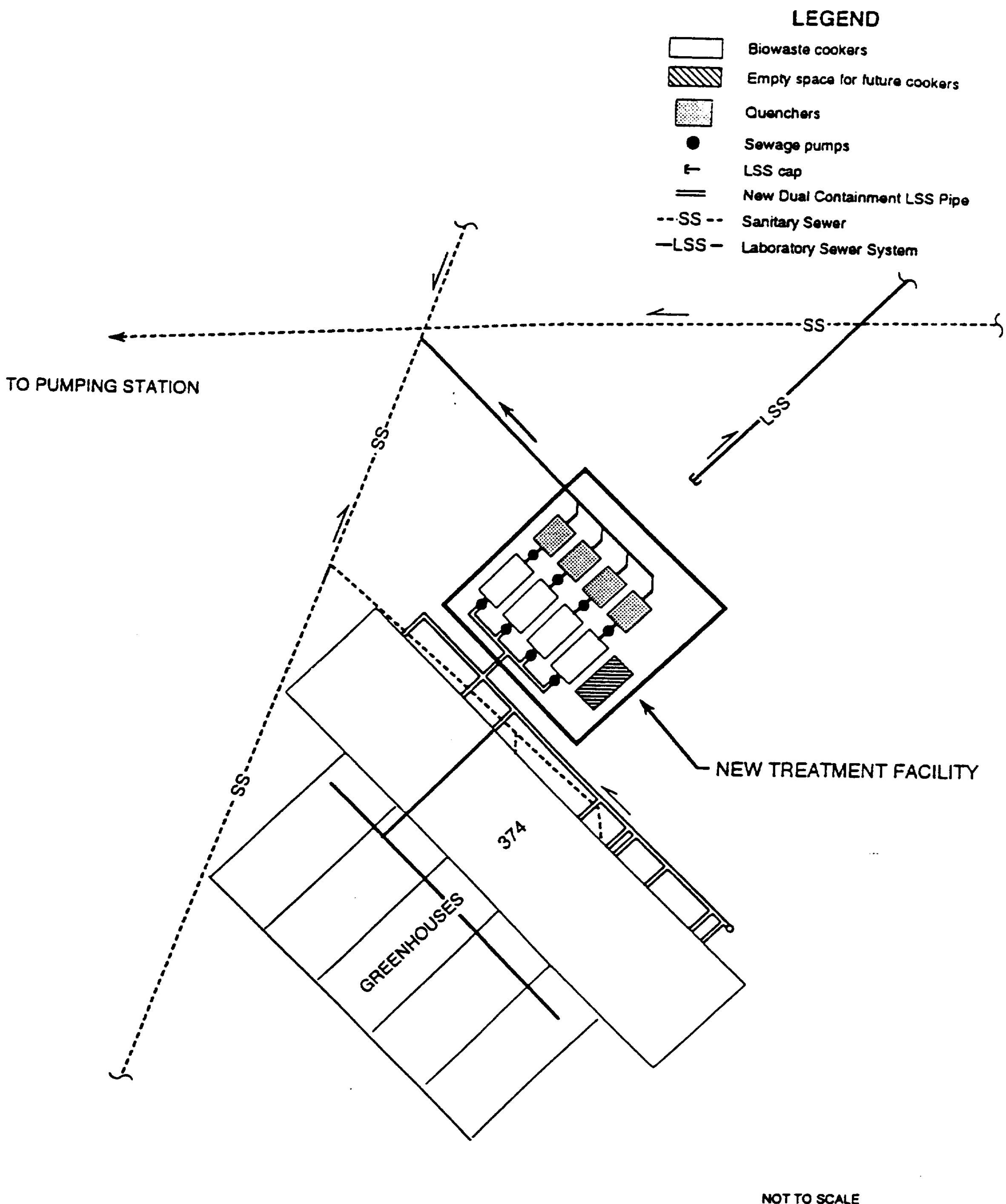

FIGURE 2-4 Potential Location for the New USDA Treatment Facility
(Taken and modified from RASco, Inc., 1996)

2.6.5 Deactivation & Decontamination of the Existing Steam Sterilization Facility

Deactivation of the SSP (Building 375) would not be completed until the new sterilization facilities have been thoroughly tested and are in operation. Upon cessation of existing SSP operations, steam sterilization equipment such as heat exchangers, steam injectors, sewage pumps, and storage tanks would be decontaminated, removed from the building, and properly disposed. Decontamination would be accomplished with the use of either sodium hypochlorite, Clorox, or steam (Sheffer, 1996b). Depending upon the type of waste generated by the dismantling of the steam sterilization equipment, wastes would either be recycled (metals) or disposed of in the Fort Detrick landfill located in Area B. Once the building has been rendered safe, it would then be renovated and used for other purposes which would be determined at a later date (or demolished).

2.7 POLLUTION PREVENTION

The environmental management of this program would include the prevention of pollution through design/process modifications in accordance with NEPA and AR 200-2 (Army Acquisition Pollution Prevention Support Office (AAPPSO) 1994). Therefore, USAG would demonstrate that it has incorporated pollution prevention measures into the design, modification, and operation of the LSS-SSP system. Pollution prevention practices include source reduction, closed-loop recycling, other types of recycling, energy recovery, and hazardous waste treatment or disposal.

One current pollution prevention measure that is in place is the containment area surrounding the SSP aboveground storage tanks. This containment area would hold the contents of the tanks and prevent leakage into the surrounding environment in the event of a spill. The recycling of components of the dismantled steam sterilization equipment may also be incorporated into the proposed action. The movement of the sterilization facilities closer to the sources of wastewater is another pollution prevention measure that would be included in the proposed action.

2.8 WASTE MANAGEMENT

After decontamination of the SSP, all of the steam sterilization equipment would be removed from the building. All wastes generated by the dismantling of the SSP may either be recycled (i.e., metals) and/or disposed of in the Fort Detrick landfill located in Area B. The SSP building would either be renovated at a later date to be used for other purposes or demolished.

2.9 HUMAN HEALTH & SAFETY

On 29 and 30 May 1996, representatives of USAG, USAMRIID, USDA, NCI, and nationally recognized experts in biosafety met to discuss the best course of action for the LSS-SSP system at Fort Detrick. The BAG committee, which consisted of six biosafety experts, reviewed all data and options available for the LSS-SSP system. The major criteria used by the BAG in evaluating the alternatives were maximized safety and minimized potential risk to the public and the workforce. The BAG concluded that a SSP or equivalent sterilization facility is required for USDA and USAMRIID but not for NCI, because of the activities conducted and/or the level of treatment provided at these facilities prior to discharge. The committee also concluded that any needed wastewater treatment should be provided as close to the source of the wastewater generation as possible. The BAG recommended that treatment of non-BL- wastewater from USAMRIID at the SSP or an alternative treatment facility should be studied further. The BAG indicated that emergency repairs of the LSS are not required since the present condition of the LSS does not pose an immediate human health hazard to the workforce or the public. The committee concluded that implementation of a corrective alternative (see Section 3.0 for a full discussion of the alternatives) in the near future will provide sufficient protection for the workforce of Fort Detrick and members of the public.

Several safety precautions are required in the laboratory to ensure that no etiologic agents leave the laboratory. Current procedures at all laboratories on Fort Detrick require sterilization or inactivation of all infectious material and toxins from BL-3 and BL-4 facilities before release into the LSS-SSP system. However, because the USDA Building 374 greenhouse complex works with bacteria, fungi, and viruses that do not pose a risk to human health, they are not required to follow these procedures (DA, 1996). Adherence to these and other safety precautions is necessary to protect the workforce, the public, and the environment from the risks associated with work involving etiologic agents.

In 1994, Hydro Geo Chem, Inc. was tasked by USAG to design and conduct a leak investigation of the LSS to evaluate the integrity of the system. This study was conducted by injecting tracer gas into the LSS and sampling the surrounding soil for detection of the tracer. Locations where the tracer was detected in the soil gas were identified as potential leaks in the LSS (see Appendix G) (Hydro Geo Chem, Inc., 1995). In 1995, USACHPPM conducted a Health Risk Assessment to evaluate the health risks posed to the workforce and the public by the operation of the current LSS- system. The purpose of this study was to evaluate the health risks associated with potential environmental exposures associated with the LSS system. To accomplish this task, the study investigated the soil, groundwater, and sewage contents of the LSS. This investigation focused on three study sites that were identified in the Hydro Geo Chem study as the worst case potential LSS leak scenarios (Hydro Geo Chem, 1995). Soils from these sites were tested for viable *E. coli* and *Bacillus anthracis.* The USACHPPM study concluded that there was sufficient chemical and biological evidence to indicate that LSS wastewater is leaking into the soil around some of the underground pipes of the LSS. However, there was insufficient evidence to conclude that LSS wastewater leaks have entered the groundwater below the LSS. Neither B. *anthracis* nor E. *cold* were detected in the soil samples. Very low levels of other fecal coliform bacteria were found in soil near the LSS. Although the report concluded that at present there were no human health risks to the public, eventual transport of potentially infectious wastewater to the groundwater is possible (see Appendix I).

The USACHPPM study detected molecular biomarkers for avirulent (not capable of causing disease) B. *anthracis* from wastewater samples collected at the entrance of the LSS into the SSP, suggesting that biohazardous microorganisms may potentially exist within the LSS wastewater. USACHPPM recommended that remedies for the leaking sections of the LSS be implemented and that establishment of routine monitoring of wells and the LSS wastewater would minimize potential health risks (USACHPPM, 1 996).

Some risks would exist to excavation workers if contaminated soil is disturbed. A small portion of the LSS in the vicinity of NCI buildings would be decontaminated and converted for use as a sanitary sewer. All other LSS pipe would be disinfected with sodium hypochlorite solution or Clorox and left in place (i.e., disinfect, drain, and abandon). It would be unnecessary to remove the LSS pipes after disinfection. A limited number of excavations would be required to disconnect NCI from the LSS and to reconnect to the sanitary sewer. Risks to excavation workers would be minimized by strict adherence to health and safety protocols designed to prevent exposure to etiologic agents.

Etiologic agents differ in their requirements for survival and reproduction. Some are extremely fragile and unlikely to survive outside of controlled laboratory conditions or appropriate host species. Etiologic agents such as these are unlikely to remain viable following exposure to the elements (e.g., ultraviolet radiation from the sun, changes in humidity). Others are more likely to survive variations in temperature, moisture, and available nutrients. Etiologic agents which might be capable of surviving for extended periods of time outside of the laboratory in soil and/or water include B. *anthracis, Coxiella burnetii, Mycobacterium spp.,* and some hepatitis viruses (DA, 1989).

The SSP would be decontaminated before any dismantling procedures are performed. This would minimize the risk posed to workers who would be dismantling and disposing of the steam sterilization equipment. The building itself would be rendered safe before renovation activities are initiated.

3.0 Alternatives Considered

3.1 RANGE OF ALTERNATIVES

An EA must identify and explain the existing "range of alternatives" to the proposed action. The range of alternatives includes all reasonable alternatives to the proposed action which would avoid or minimize adverse impacts. Reasonable alternatives must be rigorously explored and objectively evaluated before being eliminated from detailed study with a brief discussion of the reasons for their elimination (40 CFR 1502.14[a]).

3.2 IDENTIFICATION OF REASONABLE ALTERNATIVES

The proposed action and subject of this EA are the rerouting of all NCI wastewater to the sanitary sewer, construction of two new local sterilization facilities, the decontamination and abandonment of the LSS-SSP system, and dismantling of the steam sterilization equipment at Fort Detrick, Maryland (Alternative I) (Section 2.0). During the preparation of this EA, several alternatives to the proposed action were identified. These alternatives included: reduced SSP operations and rerouting ail NCI flows to the sanitary sewer system (Alternative I); reduced SSP operations, rerouting all NCI flows to the sanitary sewer, Installation of double wall pipe with leak protection from USDA and USAMRIID to the SSP, and interstitial monitoring (Alternative III); and continued operation of the existing LSS and SSP system (Alternative IV, no action).

3.3 REJECTED ALTERNATIVES

As discussed in Section 2.9, the BAG committee was instrumental in the choice of alternatives to further explore in this EA. Their evaluation of the current state of the LSS-SSP system identified feasible alternatives to the existing LSS-SSP. The BAG committee recommended the selection of a treatment method which does not include the unnecessary treatment of NCI wastewater at a sterilization plant and a method which minimizes the distance between the sterilization plant(s) and the source of the wastewater. The major criteria used by the BAG in evaluating the alternatives were maximized safety and minimized potential risk to the public and the workforce (see Appendix K).

After careful consideration, several identified alternatives were rejected as unreasonable. The reasons for their elimination are briefly discussed below. The *Engineering and Economic Feasibility Study: Laboratory Sewer System and Steam Sterilization Plant* (RASco, Inc., 1996) evaluated seven different alternatives regarding handling and treatment of wastewater originating from NCI, USDA, and USAMRIID (see Appendix L). Three of these alternatives were determined to be less desirable than the alternatives selected for consideration in this EA.

One rejected alternative included maintaining status quo of the LSS-SSP system with integrity testing of the LSS and expanded surveillance and evaluation of the system. This alternative was rejected because of continued reliance on the existing, aging sewer system, it does not eliminate transporting potentially infectious wastewater across the Installation before receiving treatment, and it is very expensive to implement.

The second rejected alternative entailed maintaining status quo of the LSS-SSP system with NCI discharges rerouted to the sanitary sewer and operational changes in the SSP. This alternative was considered unreasonable because of continued reliance on the old, aging LSS-SSP system. Under this alternative, potentially infectious wastewater would continue to be transported across the Installation before receiving treatment.

The third rejected alternative included decontamination and abandonment of the SSP and replacement with local treatment facilities for all USAMRIID and USDA flows, discharge from the two new facilities through the decontaminated LSS to the sanitary sewer, and NCI flows discharged through the decontaminated LSS to the sanitary sewer (RASco, Inc., 1996). The third alternative was rejected as unreasonable because it does not minimize the total length of the LSS that would be converted to sanitary sewer nor does it minimize the associated maintenance costs. In accordance with 40 CFR 1502.12, these alternatives would not be explored or evaluated within the remainder of this EA. More detailed information concerning the issues associated with the proposed action are provided in Appendices M through U.

3.4 REASONABLE ALTERNATIVES

From the original seven alternatives evaluated by RASco, Inc. (1996), four were selected for further consideration. The four alternatives that encompass the range of reasonable alternatives examined within this EA follow:

3.4.1 Alternative I - Deactivation of the LSS-SSP System, Construction of Two New Local Treatment Facilities for USAMRIID & USDA Flows, & Reroute all NCI Wastewater to the Sanitary Sewer System

Alternative I entails the decontamination and abandonment of the laboratory sewage and steam sterilization facilities at Fort Detrick. These actions include disconnecting NCI from the steam sterilization facilities by rerouting all NCI flows to the sanitary sewer, the construction of two new local sterilization facilities for wastewater originating from USAMRIID and the USDA Building 374 greenhouse complex, and dismantling the existing steam sterilization equipment. All wastewater from the USDA and USAMRIID local treatment facilities, and from NCI would be discharged to the sanitary sewer if this alternative is implemented. The decontaminated and abandoned LSS would be left in place (Figure 2-2) (RASco, Inc., 1996). Alternative I allows for good risk management by providing a treatment facility in close proximity to the generators of BL-4 wastewater, a reduction in wastewater transport distance, rapid leak detection, less duplication of treatment, and considerable savings in costs through reduced energy consumption.

3.4.2 Alternative II - Reduced SSP Operation, NCI Wastewater Rerouted to the Sanitary Sewer, & Repair of LSS as Needed

Alternative II includes rerouting all NCI wastewater to the sanitary sewer which would be accomplished through reconfiguration of the LSS in the vicinity of NCI buildings. All NCI buildings that are currently connected to the LSS would be disconnected from the LSS and reconnected to the sanitary sewer system. Prior to reconfiguration, all NCI sewer lines would be decontaminated. Implementation of this alternative also involves the modification of the

SSP to treat significantly reduced flows. USDA and USAMRIID flows would continue to be handled and treated by the LSS-SSP system. Reduced SSP operation includes operating on a one shift per day schedule rather than a 24 hours a day schedule. The SSP would also be physically modified by deactivating one of the four currently active steam sterilization units (Figure 3-1). Alternative II would minimize unnecessary treatment of wastewater and simultaneously provide for BL-4 wastewater treatment in addition to disinfection processes currently conducted in place in the laboratories. This alternative is not the preferred alternative because it would continue to rely on the existing, aging system and would still require transporting potentially infectious wastewater across the Installation before receiving treatment (RASco, Inc., 1996).

3.4.3 Alternative III - Reduced SSP Operation, NCI Wastewater Rerouted to the Sanitary Sewer, the Installation of Double Wall Pipe with Leak Detection from USDA & USAMRIID to the SSP, & Interstitial Monitoring

Alternative III is the continued treatment of USDA and USAMRIID wastewater through a modified LSS-SSP system. All NCI wastewater would be rerouted to the sanitary sewer by decontamination and reconfiguration of the NCI sewer lines. In order to treat the significantly reduced flows at the SSP, the SSP would be adjusted to operate one shift per day rather than operating 24 hours a day. One of the four currently active steam sterilization units would be deactivated. Further, the existing concrete-encased iron LSS pipe, which runs from USDA and USAMRIID to the SSP, would be replaced with double wall pipe with leak detection (Figure 3-2). This alternative does not adequately address the problem of transporting potentially infectious wastewater across the Installation prior to sterilization. Further, the Installation of double wall pipe from USAMRIID and USDA to the SSP is costly and maintenance intensive. This alternative also continues to rely on the existing, aging SSP system.

3.4.4 Alternative IV- The No Action Alternative

Alternative IV, the no action alternative, is to continue to treat all wastes as currently practiced, continue to monitor the system, and to replace the LSS with double walled pipe and leak detection as needed. As a component of this alternative, integrity testing of the LSS would also be performed (Figure 3-3). Implementing this alternative would result in continued reliance on the existing (aging) system. Alternative IV would be the least disruptive and would maintain redundant treatment of wastes from NCI. Alternative IV would allow potentially infectious wastewater to continue to be transported across the post before receiving treatment, it relies on the old, aging system, causes high energy consumption, and it would not adequately address the existing and potential leaks from the LSS system.

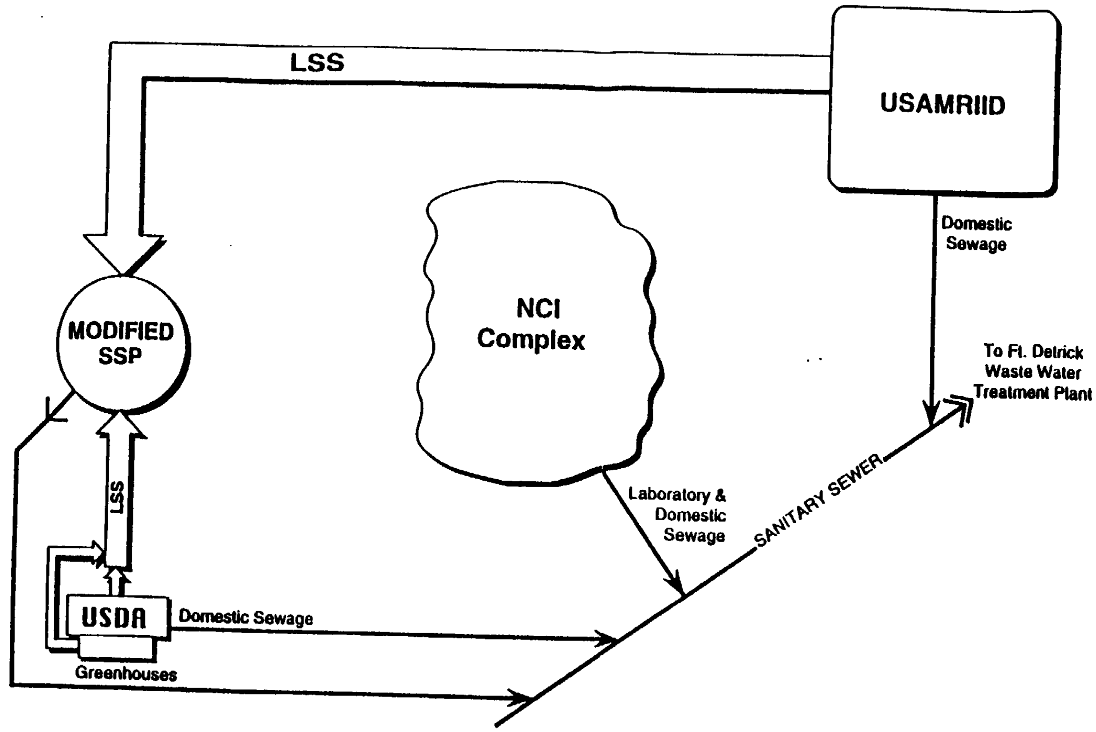

FIGURE 3-1 Schematic Representation of Alternative II
(Taken and modified from RASco, Inc., 1996)

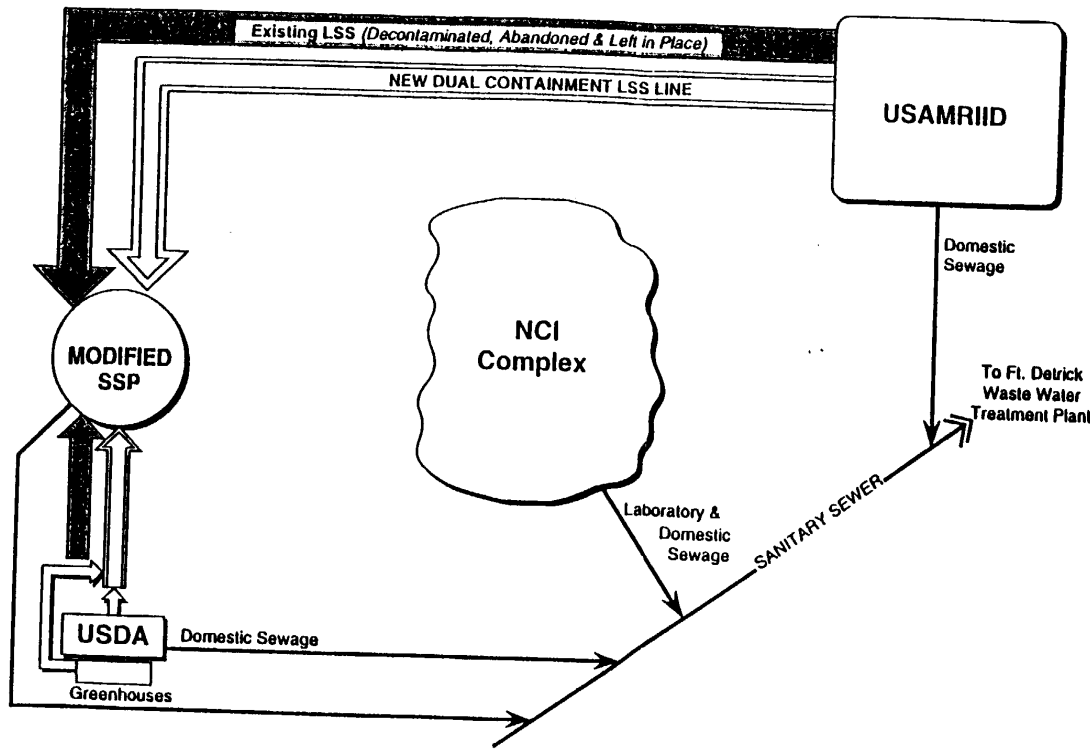

FIGURE 3-2 Schematic Representation of Alternative III
(Taken and modified from RASco, Inc., 1996)

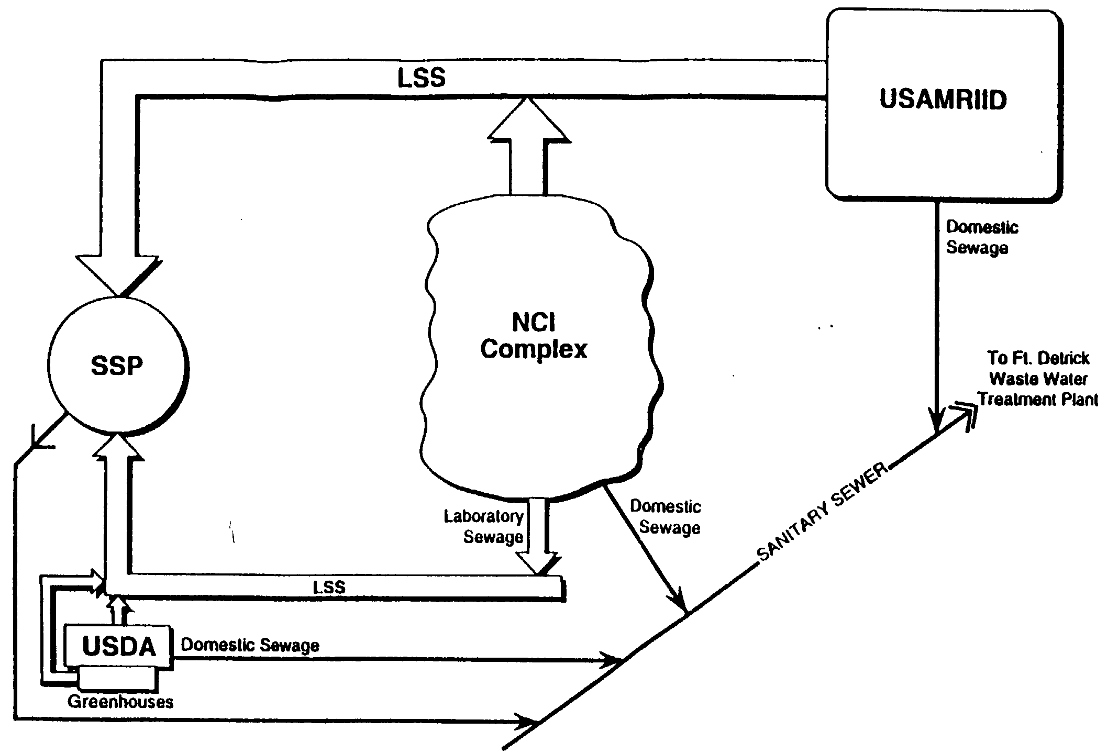

FIGURE 3-3 Schematic Representation of Alternative IV
(Taken and modified from RASco, Inc., 1996)

4.0 Affected Environment

4.1 INTRODUCTION

This section of the EA describes those aspects of the biophysical and socioeconomic environment that may be potentially affected by the modifications, reconfiguration, and abandonment of the LSS-SSP system at Fort Detrick.

4.2 EXISTING NEPA DOCUMENTATION FOR FORT DETRICK

At least four EAs and one EPG have been prepared in the past 5 years for actions at Fort Detrick. The relevant documents are: the *Installation EA (Advanced* Sciences, Inc., 1991); the COB EA (Telemarc, Inc., 1993a); the *VPF EPG* (Telemarc, Inc., 1993b); the *BRAC EA* (USACOE, 1996); the *Fluoride EA (Beaver* Schaberg Associates, Inc., 1996); and the NCI environmental documentation to reroute wastewater from NCI buildings to the Fort Detrick sanitary sewer system (NCI, 1997) (see Section 1.0 and Appendix A These documents have discussed the baseline environmental conditions at Fort Detrick in detail. More complete descriptions of the Fort Detrick affected environment may be found in these documents.

4.3 LOCATION

Fort Detrick is situated in central Maryland approximately 45 miles west of Baltimore and 45 miles northwest of Washington, DC Interstate 70, Interstate 270 (1-270), and U.S. Route 15 are the three major routes which provide access to the Installation (Figure 4-1). Fort Detrick is located on 1,230 acres in the northwest portion of the City of Frederick, Frederick County, Maryland (Figure 4-2). The City of Frederick, the largest of twelve incorporated cities in Frederick County, serves as the county seat (Frederick County Department of Zoning and Planning, 1996). The majority of the area surrounding Fort Detrick is urban/suburban As the largest county in Maryland, Frederick County covers 663 square miles (Telemarc, Inc., 1993a).

4.4 LAND USE

Fort Detrick is divided into three non-contiguous land tracks: Areas A, B. and C. Area A consists of 805 acres which serve as the main area for Fort Detrick operations. Activities located in Area A include USAG, NCI, military family housing, research and development laboratories, administrative office buildings, outdoor recreation areas, warehouses, and agricultural fields. Area B consists of approximately 400 acres and contains minor facilities including animal grazing and maintenance facilities, training for the Flair Armory (U.S. Am y Reserve Center), and a sanitary landfill (Advanced Sciences, Inc., 1991). Area C consists of two small parcels located along the west bank of the Monocacy River, east of Area A. One 7-acre parcel of Area C contains the water treatment plant (WTP), which serves the Fort Detrick population. The second parcel is a 9-acre tract one-quarter mile downstream from the WTP containing the WWTP. In accordance with AR 210-20 *(Master Planning for Army Installations),* Fort Detrick maintains an Installation Master Plan which addresses areas of concern including environmental protection, land use, transportation, natural resources, and fire/safety issues (Telemarc, Inc., 1993b).

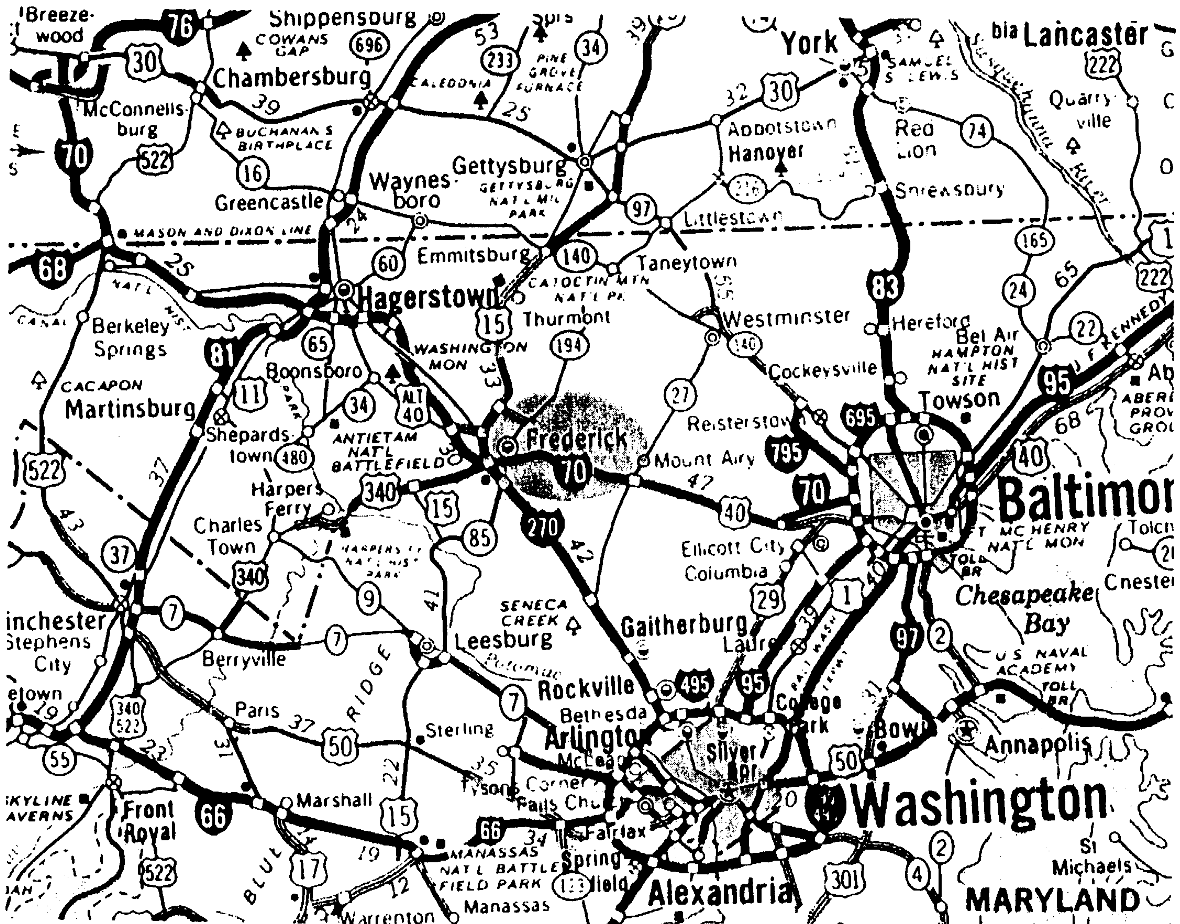

FIGURE 4-1 Location of Frederick, Maryland

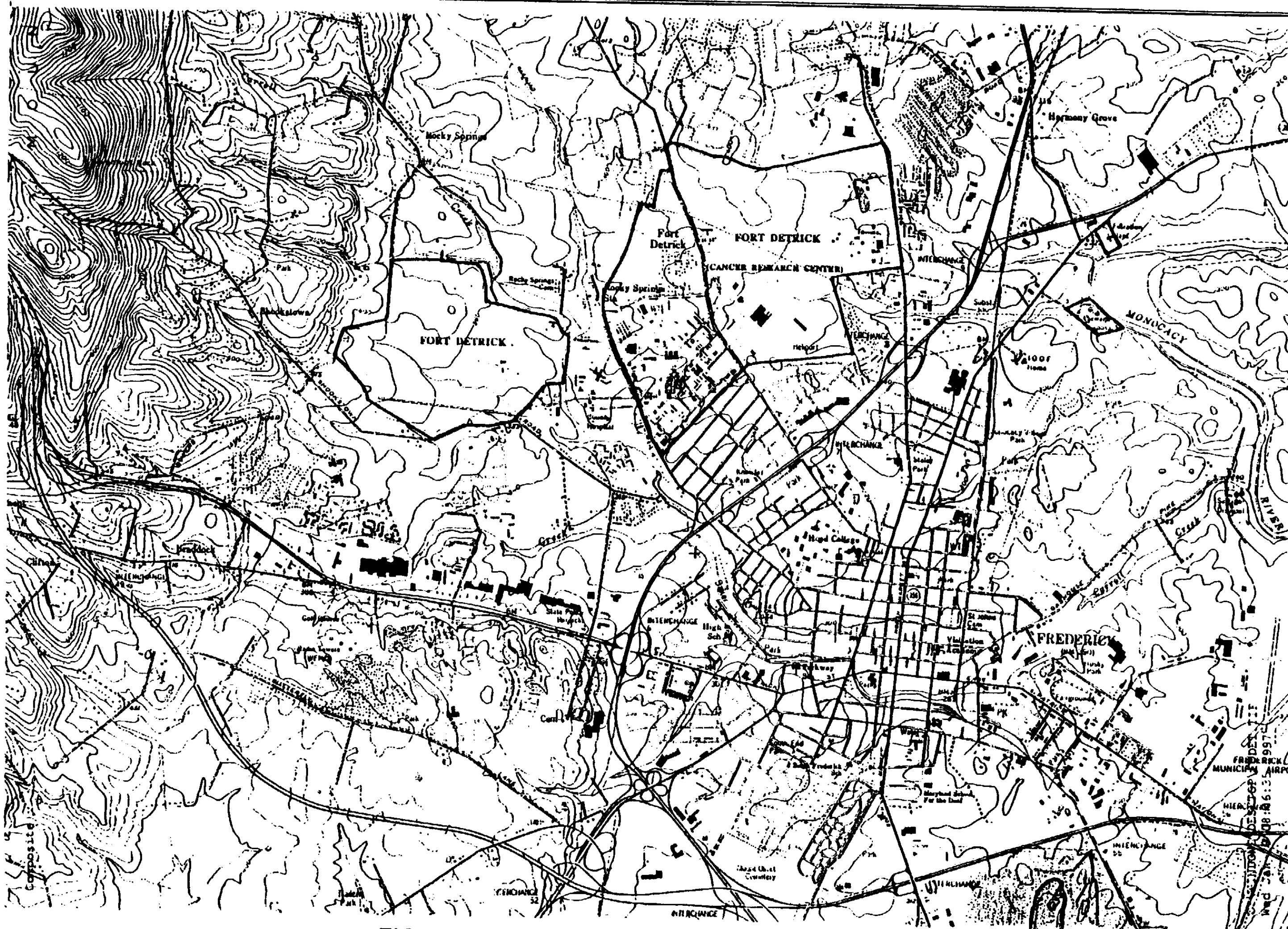

FIGURE 4-2 The Fort Detrick and Frederick Area

The region surrounding Fort Detrick consists of commercial and residential areas. Land uses adjacent to Fort Detrick are predominantly residential, but also include agricultural, commercial, and vacant lands. In general, residential densities are greatest to the south and east of Fort Detrick. The majority of retail shopping and lodging can be found in strips fronting major arteries (Telemarc, Inc., 1993a).

4.5 CLIMATE

The Catoctin Mountains are located approximately 5 miles to the west of Fort Detrick. This mountain range, with elevations of up to 1,500 feet, acts as a barrier influencing local weather conditions in the Fort Detrick region. The climate of Frederick County is characterized as humid, temperate, and continental with fairly distinct seasons. Summers in Frederick County are ordinarily short, warm, and periodically humid and winters tend to be relatively mild. Temperature extremes recorded for Frederick County range from -12°F to 109°F (Telemarc, Inc., 1993a). The prevailing wind direction is from the west-southwest and averages 7.4 miles per hour (Advanced Sciences, Inc., 1991). Average annual precipitation at Fort Detrick is just over 40 inches, with thunderstorms occurring primarily from June through August approximately 30 to 35 days per year. Snowfall averages 24 inches annually but varies significantly from year to year (USACOE, 1996).

4.6 GEOLOGY

Fort Detrick is located in the Western Division of the Piedmont Plateau physiographic province (Appalachian Highlands) which is characterized by rolling hills. Elevations in the county range from 294 feet to over 2,000 feet above sea level. Fort Detrick is situated on gently sloping terrain within Frederick Valley which is underlain by Cambro-Ordovician limestone with small amounts of shales, sandstones, and siltstones of the Newark Group. Elevations on Fort Detrick range from 320 feet to over 400 feet above sea level. Rock strata dip is typically steep with 30° to 50° dip in the region. The aforementioned rock formation manifests itself topographically in both Area A and Area B via the presence of a pronounced slope towards the southeast and the Monocacy River drainage system (Advanced Sciences, Inc., 1991).

4.7 SOILS

The soils of Frederick County are among the most productive in Maryland and consist of a combination of residual lime soils and wind-transported soils. The Duffield soil series is extensively distributed throughout Fort Detrick and Frederick County (Telemarc, Inc., 1993a). This soil type is deep, well-drained, moderately permeable, and highly suited for agricultural purposes. Available water capacity for this soil is low to moderate. In addition to the Duffield soil series, Frankstown silt loams are another predominant soil type underlying Area A of Fort Detrick. The potential of these soil types to support grasses, herbaceous plants, wetland plants, hardwoods and coniferous trees, agriculture, and associated wildlife is good (Advanced Sciences, Inc., 1991).

4.8 WATER RESOURCES

4.8.1 Surface Water

The Monocacy River drainage basin is a 970 square mile subdrainage basin of the Potomac River Basin, which eventually empties into the Chesapeake Bay (Telemarc, Inc., 1993a). The Monocacy River watershed consists primarily of cultivated lands and forests. The Monocacy River originates at the Maryland-Pennsylvania border, flows approximately 1.5 miles to the east of Fort Detrick, and terminates in the Potomac River about 15 miles south of Frederick. This major stream drains the entire region with nearly all smaller streams ultimately emptying into it. Flows are highly variable, ranging between 13 cubic feet per second (cfs) and 1,250 cfs near Frederick and 4 to 2,840 cfs at Bridgeport, Maryland (Advanced Sciences, Inc., 1991).

The Monocacy River is designated by the State of Maryland as Use IV-P, Recreational Trout Waters and Public Water Supply (COMAR 26.08.02) (Elmore, 1996). Water quality standards for Use IV-P waters require conditions suitable for supporting adult trout and are managed as special fisheries by periodic stocking and seasonal catching.

Fort Detrick obtains its water supply from the Monocacy River at a rate of about 1.3 1.5 mgd (Advanced Sciences, Inc., 1991; Grams, 1996a). Additional uses of the river include agricultural irrigation, boating, canoeing, and recreational fishing. Treated effluent and surface runoff from Fort Detrick are also discharged into the river from the WWTP. Generally, 60 to 80% of the water consumed at Fort Detrick becomes wastewater. It is estimated that 70% of the total wastewater generated at Fort Detrick originates as sanitary sewage and the remainder is industrial wastewater, which is treated as potentially infectious (Advanced Sciences, Inc., 1991; Grams, 1996b). The majority of non-contaminated wastewater travels by gravity flow through the sanitary sewer system to the pumping station in the southern corner of Area A, where it is pumped to the WWTP. Wastewater originating from most of the laboratories on the Installation (i.e., USAMRIID and USDA) is considered to be potentially infectious and is therefore collected separately via the LSS and treated at the SSP. Currently, the majority of NCI wastewater regardless of source is treated via the LSS-SSP system. All wastewater that is processed at the SSP is then transported to the WWTP for final treatment before discharge into the Monocacy River. The Fort Detrick WWTP provides secondary treatment through the use of trickling filtration to an average of 1.0 mgd with a maximum capacity of 2.0 mgd. All wastewater is de-chlorinated prior to discharge into the Monocacy River.

The MDE regulates all discharge activities from Fort Detrick. The Fort Detrick WWTP operates under NPDES Permit No. MD0020877, which allows the discharge of a maximum of 1.2 mgd of wastewater into the Monocacy River. This permit is in effect from April 1, 1992 through March 31, 1997. The renewal application was filed in September 1996. Although permit conditions allow up to 1.2 mgd, peak flows as high as 1.73 mgd were recorded in 1993. It is estimated that wastewater flows by the year 2000 could increase to 1.7 mgd in summer and 0.9 mgd in winter. Historically, flow volumes are greatest during summer months (May through September).

Designation of the Monocacy River as Use IV-P determines the amount of pollution which can be discharged. Thus, Fort Detrick may be obligated to increase removal efficiencies such that the total pollutant loading to the Monocacy River remains relatively constant. In addition, COMAR 26.08.02 requires that discharges to Use IV-P waters should not elevate stream temperatures outside the mixing zone above either 75°F or the ambient temperature of the surface waters, whichever is greater. During 1995, the maximum, minimum, and mean temperatures of the effluent discharge from the Fort Detrick wastewater treatment plans were 99°F, 52°F, and 77F, respectively (Grams, 1996b).

4.8.2 Groundwater

As a part of the broader Piedmont I lard Rock Formation, Frederick County contains some of the most productive hard rock aquifers in the state with relatively good groundwater quality. Approximately 20% of these formations have the potential to yield 50 gpm or more of water. Most of the wells in the area draw water from fractures or solution channels located within calcareous rock (e.g., limestone, marble). Extensively interconnected fractures, such as the ones found at Fort Detrick, have a high potential for groundwater contamination. Consequently, any contamination can potentially migrate over long distances through the system of fractures (Maryland Office of Environmental Programs, 1986).

The groundwater gradient in the immediate vicinity of the Installation flows to the southeast, averaging about one half of a degree. Although groundwater is regularly utilized by Army Biomedical Research and Development Laboratory (USABRDL) laboratories at Fort Detrick, it is not used for human consumption. Groundwater data from 1965 suggest that the depth of the water table in Area A ranges from 6 feet to 27 feet. Trichloroethylene (TCE) has been detected in one production well in Area A at levels above the U.S. Environmental Protection Agency (USEPA) MCL 0.005 ppm for drinking water (40 CFR 141.32). Trichloroethylene was once used as a coolant in the USABRDL. Although TCE is no longer used, it is likely that there is a zone of contaminated soil which continues to leach TCE into the groundwater supply. In 1990, water quality measurements indicated that TCE concentrations had decreased to approximately 0.18 ppm (USACOE, 1996).

4.9 PLANT & ANIMAL ECOLOGY

As a result of the urbanization of the Fort Detrick area, most of the native vegetation has been destroyed or highly altered. Approximately 500 acres at Fort Detrick are maintained as forested areas, pasture, grasses, and experimental agricultural fields. Common species of Area A are alfalfa, timothy, white clover, red clover, and a number of grasses (USACOE, 1996). A more detailed list of the flora found on Fort Detrick is provided in Advanced Sciences, Inc. (1991). Rabbit, deer, fox, opossum, quail, pheasant, ducks, and woodchucks have also been frequently observed on the Installation. The base maintains a wildlife management program (Telemarc, Inc., 1993a).

The Monocacy River is a warm water fishery, Use IV-P (COMAR 26.08.02), and water quality must be maintained to support viable populations of warm water aquatic invertebrates and fish (Advanced Sciences, Inc., 1991). The *Monocacy River 1976-1983* report conducted by the Maryland Department of Natural Resources (DNR) identified at least 43 fish species present in the river (Advanced Sciences, Inc., 1991). Smallmouth bass, black crappie, redbreast sunfish, bluegill, catfish, eels, shorthead redhorse, white sucker, and various shiners and minnows are the most common species of fish found in the middle segment of the Monocacy River (near Carroll Creek), with small populations of white crappie and brown trout (Advanced Sciences, Inc., 1991).

No threatened, endangered, or other special status plant or wildlife species are known to exist within Installation boundaries. Furthermore, none of the species that are listed in the current edition of Endangered and Threatened Wildlife and Plants (50 CFR 17.11 and 17.12) are known to inhabit Fort Detrick. The altered environmental characteristics (urbanization) of the Frederick area provide poor habitat for most species of wildlife. Given the altered environmental characteristics of the Frederick area, there is little high quality habitat for most species of wildlife. Consequently, there are no known critical habitats located on or adjacent to Fort Detrick.

4.10 WETLANDS

A 1989 preliminary wetland investigation of Fort Detrick conducted by the USACOE identified five sites that qualified as upland wetlands under the current regulatory classification scheme (Advanced Sciences, Inc., 1991). Wetland W-1 is located in the south central portion of Area B. This wetland is classified as palustrine, emergent, and possesses hydric soils which support soft rush and umbrella sedge. Wetland W-2 is part of Area B and is located 550 feet south of wetland W-1. Wetland W-2 is classified as riverine, lower perennial, and supports black locust, black willow, and silver maple. Wetland W-3 is situated in the southeast corner of Area B. This wetland system has a variety of classifications because of its diverse composition. The wetlands located in Area A, wetlands W-4 and W-5, are both low quality wetlands currently being maintained as lawns. However, during periods of high precipitation, these wetland systems hold and divert water which eventually leads to and empties into the Monocacy River.

The wetlands on Fort Detrick are beneficial to stormwater management, erosion and sediment control, and provide habitat for ducks, geese, herons, shore birds, muskrat, mink, and beaver. These marsh or swamp-like wetlands also support numerous species of annual and perennial herbaceous plants. For more detailed descriptions of Fort Detrick's wetlands, refer to the Installation EA (Advanced Sciences, Inc., 1991) and the COB EA (Telemarc, Inc., 1993a).

4.11 AIR QUALITY

Fort Detrick lies within the Central Maryland Air Quality Control Region (Area II). The air quality of Frederick County is regulated by MDE's Air Management Administration. Under the Clean Air Act (CM), the USEPA adopted the National Ambient Air Quality Standards (NAAQS) to control a select group of widely occurring pollutants. The NAAQS pollutants are carbon monoxide, nitrogen oxides (NOx), sulfur dioxide, volatile organic compounds (\/OCs), lead, and particulate matter. The provisions of the CM are only applicable to major sources (e.g., incinerators, fossil-fueled boilers, and laboratories). Fort Detrick as a whole is a source, therefore all activities at Fort Detrick are combined to determine regulatory compliance (Telemarc, Inc., 1 993b).

The air quality of Fort Detrick, as well as the whole of Frederick County is good. However, pursuant to the CM amendments of 1990, all of Frederick County was reclassified by the USEPA as a serious non-attainment area for ozone. This designation is primarily based upon emissions from vehicular traffic in the Frederick area, which cause ozone concentrations to periodically exceed the NAAQS during warm weather months. Incinerators, boilers, and diesel generators constitute the stationary sources of air pollution at Fort Detrick. Mobile sources of air pollution are commuter and on-site traffic. In a serious nonattainment ozone area, a major source is defined as a single source which emits or has the potential to emit 50 tons per year (spy) of NOx or VOCs. The MDE has ranked Fort Detrick the third largest NOx source in Frederick County (Telemarc, Inc., 1993b). The majority of Fort Detrick's NOx emissions are the Installation's central boiler plant and generator facilities; whereas, the primary source of VOCs is the landfill based on a USEPA model.

Title III of the CM regulates emissions of hazardous air pollutants (HAPs) not covered under NAAQS. The state of Maryland, under the auspices of the CM, has established an emission standards program regulating toxic air pollutants (TAPs) which are more stringent that federal regulations. A 1992 inventory of emissions from existing sources at Fort Detrick did not identify any outstanding compliance issues for HAPs or TAPs (U.S. Army Environmental Hygiene Agency (USAEHA), 1992).

4.12 CULTURAL RESOURCES

Fort Detrick maintains a Historic Preservation Plan which was developed in cooperation with the State of Maryland Historical Trust. This plan includes the classification of select structures and sites on the Installation according to potential historic significance and identifies appropriate treatments and maintenance requirements for preservation (Advanced Sciences, Inc., 1991). The undeveloped sections of Area A and all of Area B could potentially contain sites or properties of historic importance according to the Historic Preservation Plan. Fort Detrick continues to identify and preserve prehistorical and historic cultural resources in accordance with the National Preservation Act of 1966 (as amended in 1 980).

4.13 ENERGY RESOURCES

Fort Detrick's utilities include a central heating plant (Building 190), boilers, a steam sterilization plant, and a steam distribution system. Fort Detrick's central heating plant consists of five boilers which utilize both natural gas and No. 6 fuel oil (Advanced Sciences, Inc., 1991). Natural gas is provided to Fort Detrick by the Frederick Gas Company on an interruptible basis. In fiscal year (FY) 1995, Fort Detrick consumed 6,060,582 compressed cubic feet (cog of gas and 1,703,238 gallons of No. 6 diesel fuel (USACOE, 1996).

The boilers in the central heating plant generate steam for use as process steam and for heating. Approximately 70% of all steam generated at Fort Detrick is used for process

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steam for use in the steam sterilization plant and laboratories for sterilization and humidification. Steam is distributed throughout the Installation via an extensive network of overhead and underground steam lines. The boilers operate continuously throughout the year, but not simultaneously. The plant is shut down for only 1 day a year for routine maintenance. Steam is supplied via the distribution system at 100-115 pounds per square inch gauge (psig). The current average load of the boiler plant is 73,327 pounds per hour (lbs/hr) with a total design capacity of 392,000 lbs/hr (USACOE, 1996). Approximately 60% of the feedwater used in the system is resumed to the central boiler plant as condensate where it is reused. However, condensate from the steam sterilization plant is not reused, rather it is discharged direct y into the sanitary sewer system.

Allegheny Power is under contract to supply a maximum of 20,000 kilowatts of energy to Fort DETRICK Electricity usage for the Installation in FY95 was 15,489 kilowatts (USACOE, 1996).

4.14 SOCIOECONOMIC ENVIRONMENT

The 1996 population of Frederick County has increased more than 55% since 1980. The population in 1980 was 114,792. By 1996, the county's population had grown to 178,639. City planners expect current trends to continue and project that by the year 2000 Frederick County will have grown into a community of 203,170 citizens. This substantial growth can be attributed to the expansion of the Washington and Baltimore metropolitan areas (Frederick County Department of Planning and Zoning, 1996).

The majority of the employment in Frederick County is related to services, retail, government, construction, and agriculture. Fort Detrick and NCI currently employ approximately 4,700 people (905 military and 3,745 civilian) (Frederick County Department of Planning and Zoning, 1996; USACOE, 1996). This number has grown since 1990 when the Installation employed 4,472 individuals (895 military and 3,577 civilian).

4.15 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low Income Populations*, requires that federal agencies prepare NEPA documents to address any significant adverse impacts of federal projects on minority or low income populations (USACOE, 1996). According to 1990 census data, 93.3% of Frederick County's population is Caucasian, 5.3% is African American, 1% Asian, and less than 1% other, including 1% of Hispanic origin. Census block group 7507-3 is a statistical area roughly defined by Fort Detrick on the north and west, Seventh Street on the southwest, Taney Avenue on the southeast, and Opossumtown Pike on the east. In 1990, the racial composition for this census block group was 82% Caucasian, 14% African American, 3% Hispanic, 1 % Asian, and 2% Native American or other (USACOE, 1996).

The U.S. Census defines the poverty level as the income level, based on family size, age of householder, and the number of children under 18 years of age, that is considered too low to meet essential living requirements without regard to the local cost of living. According to 1990 census data, 18% of all persons within the Census block group 7507-3 were living below the poverty level. A "poverty area" is defined by the Census Bureau as an area in which at least 20% of the population lives below the poverty level. The census block area adjacent to and including Fort Detrick is very close to this definition and therefore can be considered a low-income community under Executive Order 12898 (USACOE, 1996).

4.16 NOISE

Sources of noise on the Installation include the boiler plant, the generator facilities, the carpenter shop, as well as vehicular traffic. Surveys conducted by Army Industrial Hygiene personnel concluded that noise levels on the Installation are not excessive (Telemarc, Inc., 1993b). Due to the lack of significant sources of noise pollution, Fort Detrick is considered a relatively quiet environment that is compatible with residential areas (COMAR 26.02.03). There are no records of noise complaints directed toward Fort Detrick.

4.17 ODORS

Waste generated through research activities at Fort Detrick includes contaminated laboratory materials, animal bedding and food, animal carcasses, wastewater, and infectious and medical wastes. Excluding wastewater, these wastes must be rendered sterile through autoclaving and incineration prior to disposal. Transiently offensive odors may result from autoclaving and incineration however, they are typically localized in area and time and are rapidly dispersed in the ambient atmosphere. Steam sterilization processes at the NCI Animal Production Area (Building 1021 - 1039 & 1044 - 1049), USAMRIID (Building 1425 & 1412), and the SSP (Building 375) emit odorous emissions. Minor odors may also originate from the sewage treatment plant. No citizen complaints regarding unacceptable odors originating from Fort Detrick have occurred in the last two years. Previous complaints related to unpleasant odors originating from the Animal Production Area in Area B. however, steps were taken to remedy the situation (Covert, 1996).

4.18 TRANSPORTATION

Fort Detrick can be reached via a number of highways in the region including 1-70, U.S. 40, U.S. 340 (east-west), and 1-270 and 1-15 (north-south). Interstate 270 and the other major roadways that converge in the City of Frederick provide access to Washington, DC, Baltimore, and other employment centers in the region. Commercial airline service to the Fort Detrick area is available at the Baltimore-Washington International Airport, Dulles International Airport, and Washington National Airport.

5.0 Environmental Consequences

5.1 INTRODUCTION

Section 5.2 discusses potential impacts to the affected environment associated with disconnecting NCI from the LSS-SSP system. Potential environmental impacts related to the conversion of the portion of the LSS in the vicinity of NCI buildings are presented in Section 5.3. Section 5.4 discusses potential environmental impacts associated with the construction of the two new sterilization facilities at Fort Detrick. The potential impacts to the environment related to the disinfection and partial abandonment of the LSS and the deactivation and decontamination of the SSP are presented in Section 5.5 and Section 5.6, respectively. Section 5.7 presents a comparison of the potential environmental impacts associated with the proposed action and the alternatives.

5.2 ENVIRONMENTAL CONSEQUENCES OF DISCONNECTING NCI FROM THE STEAM STERILIZATION FACILITIES

No adverse impacts to the land use, climate, geology, soils, plant and animal ecology, wetlands, hazardous materials and wastes, cultural resources, or transportation would be expected to result from disconnecting NCI from the LSS-SSP system. Positive impacts associated with disconnecting NCI from the steam sterilization facilities include reduced energy consumption and elimination of unnecessary treatment of wastewater. The NCI CX provides documentation on the environmental impacts resulting from rerouting wastewater from NCI buildings to the Fort Detrick sanitary sewer system (see Appendix A).

5.2.1 Water Resources

No significant adverse impacts to water resources will result from disconnecting NCI from the steam sterilization facilities. All wastewater that currently flows through the SSP is also treated at the Fort Detrick WWTP. NCI currently accounts for 60% of the wastewater treated at the SSP. Although flows to the WWTP would be lowered because steam would no longer be injected into NCI wastewater at the SSP, overall flows to the WWTP would not change significantly. Wastewater currently leaves the SSP at a temperature between 110°F and 135°F. However, discharging NCI directly into the sanitary sewer may reduce the temperature of wastewater reaching the treatment plant because NCI effluents would no longer be treated (heated) at the SSP. Reduced temperatures may result in the Fort Detrick WWTP being less efficient than previously because the microflora used in digestion processes at the treatment plant are more active under warm conditions. This minor negative impact will be somewhat offset by increased biological loading (concentration) to the WWTP once NCI is disconnected from the SSP. A positive impact will result to the Monocacy River because WWTP discharges will be cooler.

5.2.2 Air Quality

Air quality of Fort Detrick and the Frederick area will be improved by disconnecting NCI from the steam sterilization facilities. Fort DETRICK is in a serious nonattainment area for ozone and is considered a major source of NOx for Frederick County. Estimated emissions are more than 50 tpy of NOx (Telemarc, Inc., 1993b). Estimated annual air emissions for criteria pollutants from the five boilers currently operating at Fort Detrick are 21.7 tons of particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), 266 tons of sulfur dioxide (SO_2), 129 tons of NOx, 16 tons of carbon monoxide (CO), and 1.8 tons of VOCs (USACOE, 1996). The central boiler plant at Fort Detrick accounts for approximately 65% of the total NOx emissions. These boilers also contribute the majority of PM_{10} and SO_2 air emissions. Approximately 70% of the steam currently generated by the boilers is used for sterilization procedures in laboratories and at the SSP (USACOE, 1996). Documented flows treated at the SSP are currently estimated at 124,000 gpd. Once NCI has been removed from the system, the estimated daily average would decrease to 50,000 gpd. Removing NCI from the LSS-SSP would reduce emissions at the central boiler plant. Therefore, it is expected that disconnecting NCI from the LSS would have a beneficial impact on the air quality of the region.

5.2.3 Energy Resources

Removing NCI from the LSS-SSP system would have a positive impact on energy resources by reducing the amount of steam used at the SSP, the amount of electricity used by the SSP, and the amount of fuel consumed by the central boiler plant. Current documented flows at the SSP are 124,000 gpd of which NCI contributes 60% (74,000 gpd). Under current conditions, the SSP is operating at only 20% of total capacity. Once NCI is disconnected from the LSS-SSP system, the SSP would operate at approximately 4.3% capacity and would use less fuel to operate the boilers. Disconnecting NCI is estimated to reduce annual energy expenses for the SSP from $300,000 to approximately $60,000 (RASco, Inc., 1996).

5.2.4 Socioeconomic Environment

Table 5-1 identifies tenant reimbursements for SSP operations and maintenance costs. These reimbursements do not include reimbursements which Fort Detrick received for energy costs associated with the SSP.

TABLE 5-1 SSP Operations and Maintenance Reimbursements

Tenant	1994	1995	1996	Total	Percent
NCI	395.5	339.3	266.6	1,001.4	68%
USAMRIID	143.7	172.7	131.6	448.0	30%
USDA	9.7	10.8	8.0	28.5	2%
Total	**$548.9**	**$522.8**	**$406.2**	**$1,477.9**	**100%**

On average, NCI's reimbursements for SSP operations and maintenance are approximately 68% of SSP operations and maintenance reimbursements. Whereas, USAMRIID's and USDA's reimbursements are approximately 30% and 2%, respectively. Removing NCI from the LSS-SSP system would have a significant impact on lowering the cost of treatment for NCI (RASco, Inc., 1996). It is estimated that disconnecting NCI from the LSS-SSP would cost NCI $615,000 (Sheffer, 1996a). The costs associated with disconnecting NCI from the LSS-SSP system and reconnecting them to the sanitary sewer would be recouped in less than two years through savings in treatment costs.

5.2.5 Noise

Connecting NCI directly to the sanitary sewer system would have a positive impact on noise levels at Fort Detrick. The central boiler plant, among other activities at Fort Detrick, is a source of noise on the Installation. The amount of noise generated by the central boiler plant would decrease as operations at the SSP are reduced by removing NCI from the LSS-SSP system.

5.2.6 Odors

Disconnecting NCI from the LSS-SSP system would have a minor positive impact on odors at Fort Detrick. Some odors on the Installation originate from the SSP and the WWTP. The amount of wastewater treated at the WWTP would not be significantly impacted by disconnecting NCI from the LSS-SSP system, however, the amount of wastewater treated at the SSP would decrease which may decrease the amount of odors generated on the post.

5.2.7 Human Health & Safety

Human health risks would not be increased by disconnecting NCI from the LSS-SSP system. All pathogens/organisms and practices in use at NCI are typical of those used at other biomedical research facilities and are classified as BL-3 or lower. All potential biohazardous materials are chemically disinfected or autoclaved prior to discharge into the sewer system. The most commonly used disinfectant is bleach (sodium hypochlorite), which is effective against HIV and hepatitis viruses. There is no regulatory requirement for secondary heat treatment of wastewater originating from BL-1 BL-2, or BL-3 laboratories. Further, all laboratories that contain potential biohazardous agents are inspected twice a year for compliance with all applicable regulations and policies. Any deficiencies that are identified in an inspection are documented and tracked until completion. Because of the type of organisms used at NCI and the safety features that have been incorporated into their program, discharging NCI wastewater directly into the sanitary sewer would not pose a significant risk to the workforce or the public (CDC/NIH, 1993; DA, 1996).

5.2.8 Public Opinion

Some members of the public may perceive removing NCI from the LSS as a public health issue. The NCI inherited former biological warfare research buildings which are connected to the LSS. Current activities at NCI are very different from those occurring prior to 1969. However, due to the types of organisms used at NCI and the stringent controls in place within the laboratories, minimal risk would be posed to the workforce, the public, or the environment. The NCI does not operate and does not have plans to operate BL-4 containment facilities, which would require secondary heat treatment of wastewater. Further, there is no regulatory requirement for NCI to discharge into the LSS-SSP system (CDC/NIH, 1993; DA, 1996).

5.2.9 Cumulative Impacts

No significant cumulative impacts would be associated with disconnecting NCI from the LSS-SSP system. The volume of wastewater generated by NCI and discharged to the WWTP would not be impacted by the disconnection from the SSP. Removal of NCI from the LSS-SSP system and direct connection to the WWTP would not significantly impact the volume of wastewater currently treated at the WWTP. The WWTP is in compliance with all NPDES permit requirements.

5.3 ENVIRONMENTAL CONSEQUENCES OF CONVERTING A PORTION OF THE LSS TO A SANITARY SEWER

No adverse impacts to the land use, geology, water resources, plant and animal ecology, wetlands, air quality, cultural resources, energy resources, socioeconomic environment, noise, odors, or transportation are anticipated from converting a portion of the LSS to perform as a sanitary sewer.

5.3.1 Soils

The net impact on soil resources resulting from conversion of a portion of the LSS to a sanitary sewer would be minimal because all non-contaminated soil that is displaced during excavation would be used to bury the converted LSS. Excavation of the sites surrounding NCI buildings to access LSS pipes would be necessary to convert these pipes to a sanitary sewer. Soils in this area would be disturbed in the excavation and conversion process. Based on the results of the USACHPPM health risk evaluation, some of these soils may be contaminated by leaking LSS wastewater and therefore may pose a health risk to workers involved in excavation of the LSS pipes (USACHPPM, 1996). All potentially contaminated soil would be properly handled or disposed of to minimize potential risks to the workforce and to the public.

5.3.2 Wastewater Management

Converting the portion of the LSS in the vicinity of NCI buildings to perform as a sanitary sewer would have a temporary, minor negative impact on the quality of wastewater reaching the Fort Detrick WWTP. All converted LSS pipe would be disinfected with sodium hypochlorite, Clorox, or steam prior to conversion. The disinfectant used would be treated at the WWTP in small quantities. However, negative impacts to the quality of the wastewater would be temporary and minor because the disinfection process would occur gradually to selected portions of the LSS.

5.3.3 Hazardous Materials & Wastes

Potentially hazardous waste which would be generated by the conversion of the portion of the LSS surrounding NCI buildings includes contaminated LSS pipe. All pipe that is removed would be properly disinfected with sodium hypochlorite, Clorox., or steam prior to disposal.

5.3.4 Human Health & Safety

Risks to the health of the public and workforce would be minimized by strict adherence to required procedures. There are no current health risks to the public associated with impacted soils (USACHPPM, 1996). In order to convert that portion of the LSS in the vicinity of NCI buildings, excavation of those LSS pipes would be necessary. There are specific standing operating procedures (SOPs) for excavations and tie-ins of laboratory sewer pipe. Requirements include safety briefings, use of personal protective equipment (PPE), water to the affected buildings would be temporarily fumed off to reduce wastewater flow, disinfection of that portion of the sewer line with sodium hypochlorite, and decontamination and proper disposal of all LSS pipe that is removed. Adherence to these procedures is mandatory to ensure protection of the workforce and the public (USAG-Department of Public Works (DPW), 1993). An inflatable balloon may also be installed in the line upstream from the excavation to prevent any flow of wastewater through the exposed LSS pipe (Sheffer, 1 996a).

Potential pathways of exposure to etiologic agents include incidental ingestion, dermal contact, and vapor or particulate inhalation (USACHPPM, 1996). All possible safety precautions would be taken at the time of excavation to minimize the risk to the workforce. Further, no wastewater is permitted to exit a BL-3 or BL-4 laboratory without being sterilized. Therefore, viable etiologic agents from BL-3 or BL-4 laboratories are not expected to be present in the LSS at any time.

5.3.5 Public Opinion

Although excavation and conversion of LSS lines may pose a small risk to the workforce, there would be no risk to the public. Further, all necessary safety precautions and SOPs would be incorporated into the excavation process to minimize the associated risks.

5.3.6 Cumulative Impacts

Conversion of LSS pipe in the vicinity of NCI buildings would have no significant negative cumulative impacts to the environment.

5.4 ENVIRONMENTAL CONSEQUENCES OF THE CONSTRUCTION AND OPERATION OF TWO NEW STERILIZATION FACILITIES

No adverse impacts to the climate or geology would be expected to result from the construction of two sterilization facilities. Positive impacts associated with the construction and operation of two new sterilization facilities would include a significant reduction in the distance wastewater would travel across the Installation, less duplication of wastewater treatment, and reduced energy consumption.

5.4.1 Land Use

The environmental impacts on land use associated with the construction of two new sterilization facilities would be minimal, approximately 0.5 acres (USAMRIID facility square feet; USDA facility - 4,500 square feet) (RASco, Inc., 1996). The proposed location of the USAMRIID facility is between Buildings 1425 and 1412. This area is currently maintained as a lawn. The proposed location of the USDA treatment facility is the present site of Building 390 (RASco, Inc., 1996). Debris associated with the construction of the new facilities would be properly disposed of by the building contractor. The location for ultimate disposal of waste generated is not known at this time. Waste generated by construction activities would be non-hazardous. The ultimate disposal of waste would generate a minor adverse impact because any portions would be, by the terms of the contract, disposed of in accordance with federal and state environmental requirements and the overall amount of waste generated is small and typically non-hazardous.

A minor positive impact to land use would result from the construction of two new sterilization facilities. The proposed action is consistent with current land use patterns of Fort Detrick (Advanced Sciences, Inc., 1991). The Fort Detrick strategic planning program includes consideration of :the community, environment, safety, and development on the Installation. Construction of the new local treatment facilities would be consistent with goals of the strategic planning program (USAG, 1992) and the Fort Detrick Conceptual Future Development Plan (USAG, 1996).

Operation of the two treatment facilities would increase the area covered by impervious surfaces and increase the total volume of surface runoff in the immediate vicinity of the two proposed sites. The increased runoff may potentially impact the stormwater management system in these areas of the Installation. In accordance with Fort Detrick Regulation 420-74, *Facilities Engineering - Storm Water Management*, stormwater management practices and control measures would be implemented to mitigate any significant adverse impacts. However, the amount of increased runoff generated by the two facilities would most likely be insignificant due to their relatively small size.

5.4.2 Soils

The construction of the two treatment facilities would have a slight negative impact on local topography and erosion. It is anticipated that the effects would be minor because the proposed construction sites are not located on or near steep slopes. Soil erosion and sedimentation control measures, or Best Management Practices (BMPs), would be used to mitigate impacts in accordance with the *Maryland Sedimentation and Soil Erosion Handbook*

During routine operations of the treatment facilities disturbances would not be made to either the soil or topography of the area. Therefore, normal activities of the treatment facilities would not have a significant impact on the topography or soils of Fort Detrick.

5.4.3 Water Resources

Construction activities associated with the two new treatment facilities would have minimal negative impacts on the surface water quality of the streams in the vicinity of Fort Detrick and the Monocacy River. The most likely impacts would be associated with non-point source loadings caused by surface water runoff to the streams. Soil and sedimentation control measures would minimize loadings to the streams that drain Fort Detrick.

Construction activities are unlikely to impact groundwater resources. However, excavation could potentially impact groundwater resources. The depth of the groundwater in the vicinity of USAMRIID and the USDA Building 374 greenhouse complex is undetermined at this time. If the USAMRIID facility will include underground storage tanks, more detailed study of the local groundwater would be performed. The groundwater in Area A is not used for human consumption, therefore, potential negative impacts would be minimal.

Routine operations of the two treatment facilities would not have an adverse impact on surface waters. The wastewater that would be treated at these facilities is currently treated at the SSP and the Fort Detrick WWTP. Therefore, the quantity of wastewater treated at the Fort Detrick sewage treatment plant would not increase unless the flows from USAMRIID or USDA also increase. The quality of water being discharged to the WWTP would remain unchanged or would be improved because the new treatment facilities would employ equal or improved treatment methods than that currently used at the SSP.

Groundwater would not be used during routine operations of the treatment facilities and therefore no negative impacts to groundwater are anticipated from treatment operations. It is very unlikely that there would be leakage of wastewater into groundwater because new dual containment piping would be installed from USAMRIID and USDA to their respective treatment facilities. Further, the distance that potentially infectious wastewater would travel before receiving secondary treatment would be greatly reduced. No significant adverse impacts to groundwater are anticipated from the routine operations of the two sterilization facilities. Current potential leaks into groundwater would be eliminated.

5.4.4 Plant & Animal Ecology

There would be negligible adverse impacts to either aquatic or terrestrial communities as a result of construction activities or operation of the two new treatment facilities at Fort Detrick. The terrestrial community located at Fort Detrick is very limited due to the overall urbanization of the Frederick region. Aquatic life in the Monocacy River would not be impacted by either construction activities or operation of the new treatment facilities. Soil erosion and sedimentation control measures employed during construction would fully mitigate impacts to the aquatic life in the Monocacy River. The quality of the wastewater being discharged from the WWTP is unlikely to be negatively impacted by the operation of the new treatment facilities because the facilities would be more efficient than the current SSP.

5.4.5 Wetlands

The wetland communities of Fort Detrick would not be significantly impacted by either construction activities or operations of the new treatment facilities. Soil and sedimentation control measures would fully mitigate impacts to the wetland communities at Fort Detrick during the construction period. No impacts to the wetland communities would occur during the conduct of routine operations at the new treatment facilities because there would be no surface discharges.

5.4.6 Air Quality

Although dust would be temporarily generated by construction activities, the air quality of Fort Detrick would not be significantly affected during construction of the two new treatment facilities. Construction activities would be of a limited duration. Vehicular emissions would increase, however, it is expected that this increase in emissions would be negligible in comparison to existing levels. Therefore, construction activities would have a temporary, minor impact on ozone levels at Fort Detrick.

Operation of the new treatment facilities would cause negligible negative impacts on the ambient air quality of Fort Detrick. Minor impacts would result from the electrical energy and steam required for the operation and maintenance of the two treatment facilities. However, it is expected that emissions from energy consumption, including electricity and fuel used at the central boiler plant, would decrease from present levels the overall decreased size in facilities and improved efficiency. Vehicle emissions from the automobiles commuting to work at the treatment facilities would not change from current levels.

5.4.7 Cultural Resources

Construction and operation of the two sterilization facilities would not have a significant impact on any cultural resource because no construction activities are proposed in the Nallin Farm District of Fort Detrick. Furthermore, the proposed sites for construction and operation are not located within or adjacent to the historic district. It is unlikely that construction or operation activities would have a significant impact on any historic or archaeological structure or resource.

5.4.8 Energy Resources

No significant impacts to energy resources are anticipated from either construction or routine operations of the new treatment facilities. However, construction activities would have a negligible negative impact on depletable resources.

The consumption of energy and steam at the new treatment facilities is expected to result in a net decrease of electricity and steam usage over current consumption at the SSP. This can be attributed to increased efficiency of the two new facilities and the lack of unnecessary treatment of wastewater from NCI. Further, the new treatment facilities combined would be smaller than the existing SSP. The consumption of electricity by the two treatment facilities would be a minor component of the total electric energy consumption of Fort Detrick. The central boiler plant would generate less steam for sterilization purposes because of the overall decreased size in sterilization facilities, the improved technology of the system, and the reduced amount of wastewater being sterilized, resulting in a reduction in the amount of fuel used at the central boiler plant.

5.4.9 Socioeconomic Environment

The aesthetics of the areas surrounding the two construction sites would be slightly diminished during the construction period. Construction activities would generate some noise and odor affecting the immediate environment of Fort Detrick. These impacts would be localized in both time (during weekday work hours) and place (limited to Fort Detrick). The impacts would therefore be minor.

A minor positive impact to the economy of the Frederick region would result from the proposed action. The local construction industry, including material suppliers, would directly benefit from the construction of two new sterilization facilities.

5.4.10 Noise

Construction and operation of the two sterilization facilities would generate some noise on the Installation. Noise associated with construction activities would be negligible and temporary. Routine operations of the treatment facilities would not increase the current levels of noise because the two sterilization facilities would be smaller in overall square footage than the existing SSP, treat less wastewater, and would incorporate improved technology. Further, noise associated with the sterilization of potentially infectious wastewater would be spread out between two separate treatment locations rather than one central location on the Installation. There would be a decrease in noise generated by the central boiler plant because of the reduced production of steam for treatment purposes.

5.4. 11 Odors

Odors associated with construction of the two new treatment facilities are likely to be negligible. Routine operations of the two sterilization facilities would have a minor negative impact on odors at Fort Detrick. However, the net impact to odors at Fort Detrick is likely to be positive because less wastewater would be treated at the new treatment facilities when compared to the existing SSP. Moreover, the new treatment facilities are likely to be more efficient, further reducing transiently offensive odors from present levels.

5.4. 12 Transportation

Shipment of materials related to construction activities and the commuting activities of construction workers would cause some minor traffic congestion at Fort Detrick. Routine operations at the treatment facilities would not significantly impact current traffic flows. The net impact is an insignificant rearrangement of traffic patterns on and around the Installation.

5.4.13 Human Health & Safety

The contract for the construction of the two new treatment facilities would require compliance with the Occupational Safety and Health Act (OSHA). Dangers always exist during construction activities and would therefore present a minor adverse impact to construction workers.

The improvements to the current LSS-SSP system resulting from constructing the two new sterilization facilities would provide more efficient treatment of potentially infectious wastewater and therefore would have a minor positive impact on human health and safety at Fort Detrick. Increased protection of the workforce and the public can be attributed to several factors. These include 1) moving the treatment facilities closer to their respective sources of potentially infectious wastewater, 2) treating only those wastes that require additional treatment, and 3) and the Installation of dual containment pipe from the sources to their respective treatment facilities.

5.4.14 Public Opinion

The construction and operation of two new sterilization facilities may be controversial. These actions are being undertaken to provide for more efficient treatment of potentially infectious wastewater. Further, local treatment facilities for USAMRIID and USDA wastes would be connected to these laboratories by dual containment piping. Rigorous internal controls in place in the USAMRIID and USDA laboratories protect the health and safety of the public and the workforce.

5.4.15 Cumulative Impacts

Wastewater treatment activities at the SSP have been performed for approximately 50 years with no appreciable cumulative impacts to either the workforce or the environment. The new treatment facilities would perform activities similar to those currently practiced at the SSP but with greater efficiency. The new facilities would comply with all relevant state and federal regulations governing air and water quality. According to an analysis of the activities of the treatment facilities in the context of the environmental setting, there is no reason to suggest that significant negative cumulative impacts would accrue.

5.5 ENVIRONMENTAL CONSEQUENCES OF DISINFECTING & ABANDONING THE REMAINING LSS

No adverse impacts to the land use, climate, geology, soils, plant and animal ecology, wetlands, air quality, cultural resources, energy resources, socioeconomic environment, noise, odors, or transportation are anticipated from disinfecting and abandoning the remaining LSS. A positive impact which would be realized by disinfecting and abandoning the remaining LSS would be elimination of potential leakage into the soil and groundwater.

5.5.1 Water Resources

Disinfection processes would be completed gradually in steps to prevent discharging excessive quantities of disinfectant into the SSP and the WWTP. Only small quantities of disinfectant would be released into the SSP at any one time so that the biological efficiency of the WWTP would not be impacted. Therefore, the impacts to surface water quality would be negligible. Abandonment of the remaining LSS would have no adverse impacts to water quality.

5.5.2 Hazardous Materials & Wastes

No hazardous wastes would be generated during the disinfecting process. After disinfection of the LSS, the remaining unused pipes would be abandoned and left in place. Therefore, no additional quantities of hazardous waste would be generated by these actions.

5.5.3 Human Health & Safety

Activities associated with the disinfection and abandonment of the remaining LSS would not result in significant adverse impacts to human health. Disinfection of LSS pipes would be accomplished to ensure that all potentially contaminated pipes have been decontaminated. The decontaminated pipes would be drained and then abandoned. Therefore, the abandoned LSS would not present a risk to human health. In the event that excavation of the soil adjacent to LSS pipes is necessary, Fort Detrick will employ the appropriate health and safety measures to ensure protection of the workforce.

5.5.4 Public Opinion

There may be some public concern associated with the disinfection and partial abandonment of the remaining LSS. The USACHPPM health risk evaluation report concluded that although leakage of LSS wastewater into subsurface soil likely occurred, no B. *anthracis* or E. *coli were* detected in the subsurface soil or groundwater USACHPPM, 1996). Therefore it is highly unlikely that public exposures would occur in the future based upon the findings of this study. No threat is currently posed to the public and future health risks would be minimized by the abandonment of the LSS. The potential for eventual transport of LSS wastewater into groundwater still exists. In the event of groundwater contamination in the future, recommendations have been made to assist Installation personnel in performing the necessary remediation measures (USACHPPM, 1996). Therefore, abandoning the LSS would increase protection of the public and the workforce.

5.5.5 Cumulative Impacts

The presence of viable pathogenic organisms in the LSS is highly unlikely (see Section 2.3) as is the movement of viable organisms from LSS wastewater into groundwater. Currently, the LSS is located between 3 and 10 feet below the surface with some locations as deep as 13 feet, whereas, the depth of groundwater in Area A ranges from 6 feet to 27 feet below the surface (Hydro Geo Chem, 1995; USACOE, 1996).

Subsurface soils in the area are predominantly a sandy clay underlain by limestone which impede the movement of fluids into groundwater (Advanced Sciences, Inc., 1991). However, should a situation arise in which contamination is suspected, it may be technically difficult to pinpoint and inactivate such contamination because of the complexity of the karst aquifer structure (see Section 4.8.2). Therefore, disinfection and partial abandonment of the LSS would reduce concerns regarding the possibility of future groundwater contamination from these components of the LSS.

Disinfection and partial abandonment of the LSS would mitigate potential negative cumulative impacts, including potential impacts to human health. The current condition of the underground LSS pipes is inadequate, contributing a minor potential risk to soils and groundwater from leaking wastewater (see Section 2.9). When the LSS subsurface pipes are disinfected and abandoned the risk of potential contamination of soils and groundwater in the future would be minimized.

5.6 ENVIRONMENTAL CONSEQUENCES OF DEACTIVATING AND DECONTAMINATING THE EXISTING STEAM STERILIZATION FACILITY

No adverse impacts to the climate, geology, soils, plant and animal ecology, wetlands, cultural resources, or transportation would be expected to result from deactivating and decontaminating the SSP. A positive impact resulting from deactivating and decontaminating the existing steam sterilization facility would be reduced energy consumption.

5.6.1 Land Use

Deactivation of the SSP would not adversely impact land use on Fort Detrick. After removal of the SSP components from the facility, the building would eventually either be renovated for later use, or be demolished. No construction or demolition activities would be employed as part of the proposed action. Future uses of the facility would be determined at a later date and are not included in the proposed action.

5.6.2 Water Resources

The impacts to surface water quality resulting from the decontamination of the SSP would be negligible. Decontamination of the SSP would be performed with sodium hypochlorite, Clorox., or steam. Decontamination of the SSP in stages is necessary to prevent discharging excessive quantities of disinfectant to the WWTP. The volume of disinfectant reaching the WWTP at any one time must be kept at a minimum so that the microflora of the WWTP would not be inhibited.

Deactivation of the SSP will not cause significant adverse impacts on surface water quality. Because wastewater would no longer be heated during processing at the SSP, wastewater reaching the WWTP would be at a lower temperature than before. After the SSP is deactivated, the quantitative and qualitative characteristics of the wastewater entering the WWTP will change. A minor positive impact to surface water will result because the volume of wastewater processed at the WWTP will decrease because steam will no longer be injected into the NCI wastewater at the SSP. The concentration of organic materials in the wastewater entering the WWTP will be increased because the diluting and sterilization effects of the steam will be eliminated. The temperature of the incoming wastewater to the WWTP will be decreased because NCI wastewater will no longer be heated at the SSP. A slight negative impact to surface water may result from decreased wastewater temperature because bacteria used in the digestion processes at the sewage treatment plant function more favorably under warm conditions. This small negative impact will likely be offset, however, by the fact that the WWTP will operate more efficiently because of the increased concentration of organic materials in the wastewater entering the WWTP. A positive impact to surface water quality will result from the lower temperature of water entering the WWTP because the temperature of treated wastewater discharged from the WWTP to the Monocacy River will also be lower.

5.6.3 Air Quality

Deactivation and decontamination of the SSP would positively impact ambient air quality at Fort Detrick. Cessation of the operations at the SSP would result in a minor positive impact to the air quality of Fort Detrick by reducing NOx emissions from the central boiler plant. Approximately 70% of the steam currently generated by the central boiler plant is used for steam sterilization procedures in laboratories and at the SSP. This amount would be significantly reduced after deactivation of the *SSP*.

5.6.4 Hazardous Materials & Wastes

No impact to the quantities of hazardous wastes produced by Fort Detrick would result from deactivating and decontamination the existing SSP. Hazardous wastes would not be generated during the decontamination process. After decontamination of the SSP, the components of the facility would be properly disposed. Depending upon the type of waste removed from the building, wastes would either be recycled (metals) or disposed of in the Fort Detrick landfill. Therefore, no additional quantities of hazardous waste would be generated by these activities because all waste would be rendered sterile prior to disposal.

5.6.5 Energy Resources

Deactivation and decontamination of the SSP would have a minor positive impact on energy resources. Under current flows at the SSP (238,000 gpd) the total annual energy costs for operations are approximately $300,000. Annual energy costs at the SSP are allocated to steam usage (72%) and electricity consumption (28%) (RASco, Inc., 1996). Closure of this facility would greatly reduce the amount of steam needed from the central boiler plant. Consequently, the central boiler plant would reduce their operations and simultaneously reduce their consumption of fuel. Further, less electricity would be purchased from Allegheny Power.

5.6.6 Socioeconomic Environment

Closure of the SSP would not have a negative impact on the economic environment at Fort Detrick. The SSP would remain operational until both new treatment facilities are fully functional. There are 16 individuals currently employed at the SSP. Upon deactivation of the SSP, Fort Detrick will attempt to employ all SSP employees at other USAG positions.

5.6.7 Noise

Deactivation and decontamination of the SSP would have a minor positive impact on the noise level at Fort Detrick. Noise levels would decrease because the SSP would no longer be functional and the central boiler plant activities would be reduced. The boiler plant is currently considered a source of noise on the Installation.

5.6.8 Odors

Odors on the Installation originate from the process of autoclaving potentially infectious wastes, the SSP, and the WWTP. Autoclaving practices within the laboratories would not change. The amount of wastewater-treated at the WWTP would not be significantly affected by deactivation of the SSP. The volume of wastewater treated at the two new treatment facilities would be less than the volume currently processed at the SSP. Moreover, these modern treatment facilities are likely to be more efficient. A positive impact to odors would be anticipated from the closure of the SSP.

5.6.9 Human Health & Safety

Deactivation and decontamination of the SSP would not have a negative impact on human health and safety. Decontamination processes would be performed prior to closure of the SSP to increase protection of the public and the workforce. All steam sterilization components would be decontaminated prior to removal from the building. All of the wastes generated by the deactivation of the SSP would be properly disposed of in the Fort Detrick landfill or recycled.

5.6.10 Public Opinion

There may be some public concern over the deactivation and decontamination of the SSP. However, risks posed to the workforce and the public would be minimized. Deactivating this facility is part of an improvement to the process of treating potentially infectious wastewater at Fort Detrick.

5.6.11 Cumulative Impacts

The activities associated with the deactivation and decontamination of the SSP in the context of the environmental setting would not cause significant negative cumulative impacts to land use, water resources, air quality, hazardous materials generation, energy resources, socioeconomic environment, noise, odors, or human health and safety.

5.7 COMPARISON OF THE PROPOSED ACTION WITH THE ALTERNATIVES

5.7.1 Alternative I - Deactivation of the LSS-SSP System, Construction of Two New Local Treatment Facilities for USAMRIID & USDA Flows, & Reroute all NCI Wastewater to the Sanitary Sewer System

Alternative I includes decontamination and abandonment of the current LSS-SSP facilities at Fort Detrick. If this alternative is implemented, NCI would be disconnected from the SSP and wastewater flows would be rerouted directly to the WWTP. Two new local sterilization facilities would be constructed to treat wastewater from USAMRIID and USDA. This alternative is the preferred alternative because it eliminates unnecessary transport of potentially infectious wastewater over large distances on Fort Detrick, provides for rapid leak detection, and would result in significant cost savings through reduced energy expenditures. Alternative I best supports the mission of USAG, minimizes unnecessary wastewater treatment, and fully mitigates potential health impacts associated with leaks in the LSS.

5.7.2 Alternative II - Reduced SSP Operation, NCI Wastewater Rerouted to the Sanitary Sewer, & Repair of LSS as Needed

Like Alternative I, implementation of Alternative II entails rerouting NCI wastewater directly to the WWTP and eliminates the unnecessary treatment of NCI wastes at the SSP. The SSP would operate under a reduced schedule. Under Alternative II, however, the portions of the LSS serving USAMRIID and USDA would remain operational. This alternative is not the preferred option because it relies on the structural integrity of the existing, aged LSS and includes the transport of potentially infectious wastewater over long distances at Fort Detrick. Alternative II does not completely mitigate potential health impacts related to groundwater contamination from the LSS.

5.7.3 Alternative III - Reduced SSP Operation, NCI Wastewater Rerouted to the Sanitary Sewer, the Installation of Double Wall Pipe with Leak Detection from USDA & USAMRIID to the SSP, & Interstitial Monitoring

Alternative III includes rerouting NCI wastewater directly to the WWTP, operation of the SSP under an abbreviated schedule, and replacement of the existing LSS pipe between USAMRIID and USDA and the SSP with double wall pipe with leak detection. Alternative III is not the preferred alternative because the Installation of double wall pipe is both costly and maintenance intensive, continues to rely on the existing, aging SSP, and does not fully address the transport of potentially infectious wastewater over long distances on the Installation. If Alternative III is implemented, the risks associated with the transport of potentially infectious wastewater across the Installation would not be fully minimized.

5.7.4 Alternative IV - No Action Alternative

Alternative IV is the no action alternative. Under this alternative all wastewater would continue to be treated at the SSP. The LSS would be repaired or replaced as needed with dual containment piping. Integrity testing of the LSS would need to be performed periodically to monitor leaks. Alternative IV is not the preferred alternative because of continued transport of potentially infectious wastes across Fort Detrick, the use of the aging LSS, the inability to adequately assess leak potential, large energy consumption, and the continued sterilization of wastewater which does not require sterilization. Alternative IV would not reduce potential health impacts as effectively as the preferred alternative

6.0 Conclusions

The proposed action (Alternative I) to decontaminate and abandon the current LSS-SSP facilities at Fort Detrick, reroute wastewater flows from NCI to the WWTP, and the construction and operation of two local treatment facilities near USAMRIID and USDA is the option which best suits the needs of the DA. Alternative I would have no significant adverse environmental impacts and would result in negligible risks to health of the public and workforce. Implementation of Alternative I would eliminate unnecessary transport of potentially infectious wastewater across Fort Detrick while significantly reducing energy consumption. Alternative I would not cause any significant adverse environmental impacts and would result in important benefits to the national defense. None of the other three alternatives examined in the EA, including the no action alternative, sufficiently mitigate potential human health and safety issues associated with the leaking LSS. Benefits of the proposed action far outweigh the negligible risks.

The most severe potential effects associated with the proposed action are anticipated to be minor, and actually observed effects are likely to be insignificant. Activities involving the use and disposal of potentially infectious wastes have been conducted at this location for approximately 50 years and the environmental quality of the area remains good. Detailed analyses of the individual activities and impacts of the proposed action, as well as the actual cumulative impacts of other entities in the immediate vicinity of the Fort Detrick, did not reveal any significant adverse environmental impacts. Therefore, individual and cumulative impacts of the proposed action would be minor.

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10.0 Acronyms & Abbreviations

AAPPSO	Army Acquisition Pollution Prevention Support Office
APHIS	Animal and Plant Health Inspection Service
AR	Army Regulation
BAG	Bio-Assessment Advisory Group
BL	biosafety level
BMPs	Best Management Practices
BOD_5	biological oxygen demand - 5 days
BRAC EA	Realignment/Construction Environmental Assessment
CAA	Clean Air Act
ccf	compressed cubic feet
CDC	Centers for Disease Control and Prevention
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	carbon monoxide
COB EA	Consolidated Operations Building Environmental Assessment
COMAR	Code of Maryland Regulations
CWA	Clean Water Act
CX	Categorical Exclusion
DA	Department of the Army
DIS	Directorate of Installation Services
DMSB	Defense Medical Standardization Board
DNR	Department of Natural Resources
DPW	Department of Public Works
DSE	Directorate of Safety and Environment
EA	Environmental Assessment
e.g.	for example
FCRDC	Frederick Cancer Research and Development Center
Fluoride EA	Fluoridation of the Fort Detrick Drinking Water System EA
FY	fiscal year
gpd	gallons per day
gpm	gallons per minute
HAPs	Hazardous Air Pollutants
1-270	Interstate 270
i.e.	that is
Installation EA	Installation Environmental Assessment
IPB	Installation Planning Board

Acronyms & Abbreviations (continued)

ISSA	Interservice Support Agreements
lbs/hr	pounds per hour
LSS	laboratory sewer system
MDE	Maryland Department of the Environment
mgd	million gallons per day
MPN	most probable number
NAAQS	National Ambient Air Quality Standards
NCI	National Cancer Institute
NEPA	National Environmental Policy Act
NIH	National Institutes of Health
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Act
PAM	pamphlet
PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
PPE	personal protective equipment
psig	pounds per square inch gauge
SO_2	sulfur dioxide
SOPs	Standing Operating Procedures
SSP	steam sterilization plant
TAPs	Toxic Air Pollutants
TCE	Trichloroethylene
tpy	tons per year
USABRDL	U.S. Army Biomedical Research and Development Laboratory
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USACOE	U.S. Army Corps of Engineers
USAEHA	U.S. Army Environmental Hygiene Agency
USAG	U.S. Army Garrison
USAMMA	U.S. Army Medical Materiel Agency
USAMRIID	U.S. Army Medical Research Institute of Infectious Diseases
USAMRMC	U.S. Army Medical Research and Materiel Command
USAMU	U.S. Army Medical Unit
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
VOCs	volatile organic compound(s)
VPF EPG	Vaccine Production Facility Environmental Planning Guide
WTP	water treatment plant
WWTP	wastewater treatment plant

APPENDICES

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APPENDIX A
LABORATORY SEWER SYSTEM
DISCONNECTION
at the
NATIONAL CANCER INSTITUTE
FREDERICK CANCER RESEARCH AND DEVELOPMENT CENTER
(January 15, 1997)

GENERAL DESCRIPTION

The National Cancer Institute, Frederick Cancer Research and Development Center (NCI-FCRDC) is a 69 acre facility located on Fort Detrick in Frederick, Maryland. The NCI-FCRDC consists of approximately 80 administrative, laboratory and support buildings which have been built over the past 50 years. The facility is currently used exclusively for medical research in the fight against cancer and other infectious diseases.

Fort Detrick was originally designed and constructed with two separate building drainage systems that were configured to handle the United States Army Garrison (USAG) sanitary waste separately from its laboratory waste. The Sanitary Sewer (SS) handles waste from toilets and other building operations and is a traditional vented sewer system tied together with manholes. The Laboratory Sewer System (LSS) is a completely separate network of sealed underground piping and cleanouts receiving waste from laboratory fixtures. On Fort Detrick the United States Department of Agriculture Facility (USDA) and the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) as well as the NCI-FCRDC drains its laboratory waste into the LSS which is then processed through the Steam Sterilization Plant (SSP). Laboratory waste is then combined with the SS discharge and then treated at the Sanitation Waste Water Treatment Plant before being discharged. Since 1971 the NCI-FCRDC has continued to use the LSS in twenty-one of its buildings as a matter of convenience. Multiple protocols are in place to prevent harmful waste from being discharged into either the SS or LSS. As a result NCI-FCRDC waste discharged into the LSS is unnecessarily processed through the SSP and then reprocessed at the Sanitation Plant.

The NCI-FCRDC will disconnect from the LSS under a plan that has been developed to reroute all laboratory waste to the SS and by pass the SSP. This course of action is being taken for environmental (energy conservation) and economic reasons. Reducing the amount of waste water being processed at the SSP will decrease the amount of energy required to operate the SSP. Savings will be achieved by eliminating the operation and maintenance costs associated with the LSS and SSP.

Current operation of the NCI-FCRDC does not require that laboratory wastes be segregated from sanitary wastes. The only laboratories that require heat treatment of liquid wastes prior to discharge into the sewer system are Biosafety Level 4. The NCI-

FCRDC does not have any laboratories operating at Biosafety Level 4. NCI-FCRDC safety protocols require that all wastes produced in the laboratories be properly neutralized prior to disposal or discharge into the drains. Monitoring and oversight of the laboratory safety protocols is accomplished by the Safety and Environmental Protection Program (SEPP).

Waste water currently being discharged into the LSS will be routed into the SS by modifying the sewer system connections at several key locations. Existing LSS piping will be utilized to the greatest extent possible and supplemented with new sewer lines as deemed necessary.

PROJECT DETAILS

The disconnection plan will eliminate all NCI-FCRDC discharge into the LSS from specified buildings by a series of strategic tie-ins to existing SS piping and manholes. Where necessary new SS lines will be added in areas where existing piping is not convenient for tie-in or where existing piping is not adequate to handle increased flows. A total of one thousand five hundred (1500) feet of new SS piping will be required.

A tie-in of a 12" LSS line and a 6" LSS line into an existing SS manhole (MH 16) in the area north of building 313 will remove a large portion of the NCI-FCRDC buildings from the LSS. Buildings affected by this tie-in are 313, 314, 325, 427, 428, 429, 430, 431, 432, 433, 434, 469, 472, 522, 567, and USAG operated buildings 524 and 568. The work will require about thirty (30) feet of new SS pipe to be run to the manhole with clean outs to the surface where required. Temporary shut-down of those buildings feeding into the two pipes will be scheduled in order to make the necessary tie-in.

Building 560 will be disconnected from the LSS with two separate connections to the SS, one for lines on the north side and the other for the south. The tie-in for the south of building 560 will require about sixty feet (60) of new SS pipe that will connect the LSS line to a SS manhole (MH 80) southwest of building 560. Flow from the north side will be disconnected through a tie-in at the southeast of the building where the LSS passes over the SS main. This tie-in will be a new manhole on the SS that will allow the LSS flow to be introduced at this point. The building 560 connections will require temporary shutdown of the LSS flow from building 560.

A simple connection west of building 550 where the LSS discharges from that building and crosses over the SS will be accomplished by connecting the two with a vertical run of SS pipe about ten feet (10) including a clean out to grade. Temporary shutdown of building 550 LSS discharge will be required to make the connection.

Building 571 LSS will be routed to a nearby SS manhole with about five feet (5) of new pipe and an associated clean out. The existing 4" SS line from the manhole to the SS main, which is about sixty feet (60), will be replaced with a 6" line to handle the additional flow Building 571 LSS flows will need to be shutdown to make the connection.

In order to connect the LSS discharge from buildings 535 and 539 to the SS, new piping will be run under Boyles Street to a manhole (MH 15C) southwest of building 376 Each building feed to the LSS will be tied in to and run to a new common manhole on Boyles Street. The new SS line will run down Boyles Street through two new manholes required for elevation and direction change, and then to the existing manhole southwest of building 376. The total length of new SS line to make this tie-in is about five hundred feet (500). Temporary shut down of LSS flows from each building will be required.

Building 376 LSS discharges into an LSS main under Boyles Street. The lateral from 376 is about one foot too low in elevation to have gravity flow into any SS. As a result a sewage pumping station will be installed to handle the current LSS flow from building 376 The pumping station will be located on the LSS line west of building 376 and discharge into a manhole on the new SS line installed to handle building 535 and 539 flows.

All the above tie-ins of the LSS to the SS will increase the flow on the existing 12" SS main that runs down the length of Ware Drive. The SS main is already near capacity with existing flow demand. To prevent any overloading of the sanitary sewer line a new parallel 12" line eight hundred feet (800) long will be installed from the manhole (MH 16) North of building 313 along Ware Drive to a manhole (MH 10A) near the intersection of Ware Drive and Beasley Drive. From that manhole an 18" SS main runs to the USAG sewage pumping station near building 201. The new parallel main will run south of the existing main and will require temporary shutdowns of some buildings' SS flow when the new main crosses laterals feeding into manholes along Ware Drive.

Existing g LSS lines will be cut and capped immediately down stream of all points of the Remaining LSS lines below the cap point will not be removed and will remain connected to the LSS piping.

New sanitary sewer pipe, cleanouts, and manholes will be constructed per local codes for gravity flow sanitary sewers. Pipe will be cast iron bell and spigot for sewage with appropriate connecting systems to tie in to existing pipe. Manholes will be a combination of cast in place and precast concrete depending on site conditions. New manholes will have standard cast iron covers and be properly identified.

ENVIRONMENTAL CONSIDERATIONS

The project will not change the amount of impervious area on the site in its completed state. All areas disturbed will be returned to their original surface condition. Standard sediment and erosion control practices will be implemented throughout the project and remain in place until the ground is permanently stabilized to prevent soil runoff. -

There will be no impact on the environment from sewage discharge as a result of this project. The total sewage produced by the NCI-FCRDC will be the same. The only change is the diversion of the waste formerly discharged to the LSS that will be directly merged with the SS.

Energy conservation in the form of reduced steam production and reduced electrical usage will result from the project because the SSP will no longer be utilized to process discharge from the NCI-FCRDC.

PROJECT COSTS

Economic benefits from this project will be recognized within the first two years after completion. The overall project costs are estimated to be $615,000. Currently the NCI- is charged over $325,000 annually for operation and maintenance of the Laboratory Sewer System and the Steam Sterilization Plant.

SCHEDULE

Construction of the entire project should take approximately eight months from notice to proceed. Work will be done in phases to allow for coordination of road closures and utility shutdowns, and to minimize impact of the facility as a whole. The new 12" SS main will be in place prior to the introduction of large flows from the former LSS discharge.

The NCI-FCRDC will work in. coordination with the USAG to optimize flow of work in construction activities and facilitate a smooth transition in sewage flows diverted from the LSS and SSP directly to the SS.

File: LSSNEPA

Proposal to Disconnect the NCI-FCRDC from the Laboratory Sewer System

DHHS CATEGORICAL EXCLUSION CRITERIA CHECKLIST (Updated April 17, 1996)

I.	CATEGORY #1 General Exclusions	NOTE: If the answer to any of the questions in Category #1 is "YES", the action may be categorically excluded from further NEPA review.		
	CRITERIA	YES	NO	EXPLANATION
(a)	Does a law or statute grant an exception?		X	
(b)	Have the courts found that the action does not require environmental review?		X	
(c)	Does the action implement actions outside the territorial jurisdiction of the United States and are such actions excluded from review by Executive Order 12114?		X	

II.	CATEGORY #2 Functional Exclusions	NOTE: If the answer to any of the questions in Category #2 is "YES", the action may be categorically excluded from further NEPA review.		
	CRITERIA	YES	NO	EXPLANATION
	Does the proposed action fall under any of the following categories:			
(a)	Routine administrative and management support, including legal counsel, public affairs, program evaluation, monitoring, and individual personnel actions?		X	
(b)	Appellate reviews when DHHS was the plaintiff in the lower court decision?		X	
(c)	Data processing and systems analysis?		X	

Proposal to Disconnect the NCI-FCRDC from the Laboratory Sewer System
DHHS Categorical Exclusion Criteria Checklist (Updated April 17, 1996)

II.	CATEGORY #2 (continued) Functional Exclusions	NOTE: If the answer to any of the questions in Category #2 is "YES", the action may be categorically excluded from further NEPA review.		
	CRITERIA	YES	NO	EXPLANATION
	Does the proposed action fall under any of the following categories:			
(d)	Education and training grants and contracts except projects involving construction, renovation and/or changes in land use?		X	
(e)	Grants for administrative overhead support?		X	
(f)	Grants for social services except projects involving construction, renovation, and changes in land use?		X	
(g)	Liaison functions?		X	
(h)	Maintenance, except for properties on or eligible for listing on the National Register of Historic Places?		X	
(i)	Statistics and information collection and dissemination?		X	
(j)	Technical assistance by DHHS program personnel?		X	
(k)	Adoptions of regulations and guidelines pertaining to the above activities?		X	

III.	CATEGORY #3 Program Exclusions	NOTE: If the answer to any of the questions in Category #3 is "YES", the action may be categorically excluded from further NEPA review.		
	CRITERIA	YES	NO	EXPLANATION
	After substantive review, can it be determined that the program or proposed action normally:			
(a)	Will NOT significantly affect the human environment (as defined by NEPA)?	X		There is no change in treated sewage discharge. Adequate safety precautions are in place per OSHA and SEPP Protocols.
(b)	Will NOT affect an asset (as defined in the NEPA related acts) regardless of location or magnitude of the action?	X		

IV.	CATEGORY #4 Partial Exclusions	NOTE: If the answer to any of the questions in Category #4 is "YES", the action may be partially excluded from further NEPA review.		
	CRITERIA	YES	NO	EXPLANATION
(a)	Does the proposed action produce environmental effects with respect to only a few, but not all, of the environmental acts?		X	
(b)	Is a previously conducted environmental assessment (EA) or environmental impact statement (EIS) broad enough to satisfy the NEPA requirements for the current proposed action?		X	

IV.	CATEGORY #4 (continued) Partial Exclusions	NOTE: If the answer to any of the questions in Category #4 is "YES", the action may be partially excluded from further NEPA review.		
	CRITERIA	YES	NO	EXPLANATION
(c)	Is the proposed action a response that must be implemented within thirty (30) days to an emergency health situation?		x	
(d)	Does the law require the proposed action to be taken within thirty (30) days?		x	

I.	USE OF NATURAL RESOURCES This set of criteria is concerned with the accessibility of nonrenewable natural resources such as land, mineral, and fuels, which are constantly renewed but in which short-term or local shortages might occur.			
	CRITERIA	IMPACT		
	Does the project:	YES	NO	DESCRIPTION OF ENVIRONMENTAL IMPACT
(1)	change traditional use of the land parcel (by rezoning, etc.)?		X	
(2)	alter use of other land by related development of stores, roads, or site changes?		X	
(a)	generate new stores?		X	
(b)	cause new roads?		X	
(c)	cause new parking?		X	
(3)	use land for purposes unsuitable to its physical characteristics?		X	
(4)	include the use of wetlands (swamps, marshes, etc.)?		X	
(5)	include construction in a floodplain?		X	
(6)	include the use of significant agricultural lands?		X	
(7)	block access to known mineral deposits?		X	
(8)	increase fuel and mineral consumption in state by more than 1% annually?		X	
(9)	decrease the volume of water in a lake, river, water table, reservoir, etc.?		X	
(10)	change traditional use of a body of water?		X	
(11)	divert from local and state land use planning?		X	

II. POLLUTION

This set of criteria is concerned with the processes which generate pollution. These include the introduction of pollutants into the environment, changes in the flow of energy through the environment, and changes in the composition of environments through the augmentation or deletion of substances which are naturally present. The criteria are also directly concerned with the production and one-time use of materials and the proper disposal of wastes.

	CRITERIA	IMPACT		
	Does the project:	YES	NO	DESCRIPTION OF ENVIRONMENTAL IMPACT
(1)	increase identifiable air pollution levels from a new emission source or from existing sources?		X	
(2)	increase identifiable ambient air pollution levels through a major increase in the number of or use of automobiles, trucks, etc.?		X	
(3)	exceed city or state health standards for exhausts from fume hoods?		X	
(4)	involve:		X	
(a)	dredging or swamp drainage?		X	
(b)	construction of a waste treatment plant?		X	
(c)	discharge of untreated human waste directly into a lake, river, etc.?		X	
(5)	overload existing waste treatment plants due to new loads (volume, chemicals, toxicity, etc.)?		X	
(6)	cause soil erosion (after completion of construction phase) or leaching of foreign substances (such as salt) into the soil?		X	
(7)	allow seepage of contaminants into the water table?		X	
(8)	increase the stress placed upon an identified earthquake fault?		X	

II.	POLLUTION - (Continued)			
	CRITERIA	IMPACT		
	Does the project:	YES	NO	DESCRIPTION OF ENVIRONMENTAL IMPACT
(9)	create an identifiable change in aquatic life by discharge of hot water?		X	
(10)	decrease the percolation on over one acre of land?		X	
(11)	cause storm water runoff onto the land owned by others?		X	
(12)	produce noises considered offensive to a human population, i.e., over 55 decibels (dB) A-weighted L_{dn} - day/night average sound levels with a 10-dB penalty applied to nighttime (10 p.m. to 7 a.m.) activities at the property boundary? produce cumulative adverse noise effects in conjunction with existing noise sources?		X	
(13)	create sounds which result in changes in behavior patterns of animals and/or humans (high/low noise frequencies)?		X	
(14)	introduce new sources of hazardous/toxic wastes		X	
(15)	introduce new sources of radiation?		X	
(16)	cause shock waves and/or vibration (after construction phase)?		X	
(17)	change the direction and wind velocity as to affect the local population (i.e., high-rise building)?		X	
(18)	cause a new, large volume of production of non-recycled items?		X	

II.	POLLUTION - (Continued)			
	CRITERIA	IMPACT		
	Does the project:	YES	NO	DESCRIPTION OF ENVIRONMENTAL IMPACT
(19)	result in the non-recycling of recyclable items such as laboratory glassware, animal cages and office paper?		X	
(20)	generate solid wastes which cannot be properly disposed of by existing facilities?		X	
(21)	dispose of solid wastes in polluting landfills, wells, caves, etc.?		X	
(22)	require storage of wastes pending technology for safe disposal?		X	
(23)	fail to comply with Federal, State and local requirements for waste handling, transportation or disposal methods?		X	

III.	POPULATIONS This section of the criteria addresses changes in human, animal, and plant populations.			NOTE: In this part of the criteria, the affected area is defined as being greater than 160 acres in size.
	CRITERIA	IMPACT		
	Will the action cause:	YES	NO	DESCRIPTION OF ENVIRONMENTAL IMPACT
(1)	a 5% change in the density of the local population?		X	
(2)	health, education and/or welfare services to be altered?		X	
(3)	social service needs to change by altering populations's age pattern (new schools, etc.)?		X	
(4)	a change in the transient population by 5%?		X	
(5)	a scientific alteration (genetic engineering) of the structure of genetic material in a living organism directed at human or other populations?		X	
(6)	local, state or federal standards pertaining to population densities or conservation of plants and animals to be violated?		X	

IV.	HUMAN SERVICES As society has evolved, traditional self-sufficient human communities have given way to dense populations which are dependent upon the development and application of technology. Man's highly complex, technological environments are maintained by a variety of services, ranging from the provision of the basic necessities of food and water to a complex system of economic exchange. These services are largely interdependent and their complexities must be considered.			NOTE: In this part of the criteria, the affected area is defined as being less than 160 acres in size.
	CRITERIA	IMPACT		
	Could the action disrupt:	YES	NO	DESCRIPTION OF ENVIRONMENTAL IMPACT
(1)	food supplies for 48 hours?		X	
(2)	water supplies for over 48 hours?		X	
(3)	electrical power for 48 hours?		X	
(4)	heating supplies (natural gas, heating oil) for over 48 hours?		X	
(5)	or deprive population of housing for over 48 hours?		X	
(6)	removal of sewage for more than 12 hours?		X	
(7)	removal of solid waste (trash) for more than seven (7) days?		X	
(8)	existing health service response in case of a disaster?		X	
(9)	mail, radio, telegraph, telephone, or television service for over two (2) weeks?		X	
(10)	transit service for more than two (2) weeks?		X	

IV.	HUMAN SERVICES - (Continued)			
	CRITERIA	IMPACT		
	Does the action use more than 5% of:	YES	NO	DESCRIPTION OF ENVIRONMENTAL IMPACT
(1)	remaining electrical capacity?		x	
(2)	remaining water?		x	
(3)	available capacity of the sewage treatment system (branch lines, mains, plants)?		x	
(4)	available capacity of trash disposal system (collection, incinerator plant, landfill)?		x	
(5)	available heating fuel (gas, coal, or heating oil)?		x	
	Does action decrease:		x	
(1)	food delivery system by removal of retail food stores, etc., by 5%?		x	
(2)	area's domestic housing by demolition, closing, etc., by 5%?		x	
(3)	use of existing transit systems (bus, train, etc.) by more than 5%?		x	
(4)	accessibility to routine health services by altering point of service delivery?		x	
	Will action:		x	
(1)	increase the patient load of the area's routine health care services by more than 5%?		x	
(2)	change the availability of social services by opening or closing facilities?		x	

IV.	HUMAN SERVICES - (Continued)			
	CRITERIA	IMPACT		
	Will the action:	YES	NO	DESCRIPTION OF ENVIRONMENTAL IMPACT
(3)	increase or decrease the number of social services recipients by more than 5% (by unemployment)?		x	
(4)	increase the annual volume of telephone, telegraph, or mail by more than 5%?		x	
(5)	eliminate employment sources for 10% of the population?		x	
(6)	change school enrollment by more than 5%?		x	

V.	HUMAN VALUES The fifth set of criteria is directed toward human values concerning the quality of the environment which are generally agreed upon to the extent that they are stated in statutes or regulations.			
	CRITERIA	IMPACT		
	Will the action:	YES	NO	DESCRIPTION OF ENVIRONMENTAL IMPACT
(1)	encroach upon any historical, architectural, or archaeological cultural property?		x	
(2)	affect any endangered species?		x	
(3)	violate local, state, or federal standards on aesthetics, odor, or noise?		x	

V.	HUMAN VALUES - (Continued)			
	CRITERIA	IMPACT		
	Will the action:	YES	NO	DESCRIPTION OF ENVIRONMENTAL IMPACT
(4)	use criteria, methods, or practices that would discriminate on the basis of race, color, religion, gender, national origin, age, disability, or sexual orientation?		X	
(5)	effect the environmental, human health, economic and/or social status of minority and/or low-income communities?		X	
(6)	exclude the opportunity for the public, including minority communities and low-income communities, to have adequate access to public information relating to human health or environmental planning, regulations, and enforcement pursuant to the Freedom of Information Act, the Sunshine Act, and the Emergency Planning and Community Right-to-Know Act?		X	
(7)	preclude the affected communities access to meetings, crucial documents and notices and opportunities for input during the planning process to identify potential effects and mitigation measures?		X	

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ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION OF TWO STERILIZATION FACILITIES, CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND DEACTIVATION OF THE STEAM STERILIZATION PLANT UNITED STATES ARMY GARRISON, FORT DETRICK, MARYLAND

APPENDIX B

Wastes Requiring Treatment

1. Purpose: To provide information on the requirements to treat the wastewater discharged by NCI\USAMRIID\USDA: Identify what is required due to regulatory and Department of the Army requirements. Identify requirements by waste type.

2. Facts:

a. 32 CFR CH. V Part 626 prescribes DA Safety Policy, responsibilities, and procedures for biological defense research, development, testing and evaluation operations. Part 627 prescribes the technical safety requirements for the use, handling, shipment, storage, and disposal of agents used in these operations. Part 627.32 requires material or equipment that is a potentially contaminated with an etiologic agent to be rendered nonhazardous before disposal. Part 627.46 requires for a BL 4 facility;

(1.) All liquid drains in the facility to be connected directly to a liquid waste decontamination system.

(2.) Holding tanks collecting waste from sinks, biological safety cabinets, floors, and autoclave chambers to provide decontamination by heat treatment.

(3.) Holding tanks collecting waste from shower rooms and toilets to provide decontamination by heat or chemical disinfectant methods.

(4.) Sewer and other ventilation vents to contain in-line HEPA filters.

Similar treatment requirements are not identified for BL-3 facilities.

b. The CDC/NIH guidelines for even a BL-1 recommend "ALL cultures, stocks, and other regulated wastes are decontaminated before disposal by an approved decontamination method, such as autoclaving. Materials to be decontaminated outside of the immediate laboratory are to be placed in a durable, leakproof container and closed for transport from the laboratory." For BL-4 "Liquid effluent from laboratory sinks, biological safety cabinets, floor drains, and autoclave chambers are decontaminated by heat treatment before being discharged to the sanitary sewer. Effluents from showers and toilets may be discharged to the sanitary sewer without treatment. The process used for decontamination of liquid wastes must be validated physically and biologically by use of a constant recording temperature sensor in conjunction with an indicator microorganism having a defined heat susceptibility profile." In addition "any drains in floors contain traps filled with a chemical disinfectant of demonstrated efficacy against the target agent, and they are connected directly to the liquid waste decontamination system. Sewer vents and other ventilation lines contain HEPA filters.. CDC/NIH guidelines are not regulations. They lay a foundation so that lab directors can perform a reasonable risk assessment to determine necessary practices. The laboratory director is specifically and primarily responsible for the safe operation of the laboratory.

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c. DA Pam 385-69, Biological Defense Safety Program, 31 Dec 1993, requires contaminated liquid or solid wastes from laboratories and animal rooms to be inactivated before disposal. The Pam indicates that for a BL-4 laboratory,

(1.) All liquid drains in the facility are connected directly to a liquid waste decontamination system.

(2.) Holding tanks collecting waste from sinks, biological safety cabinets, floors, and autoclave chambers provide decontamination by heat treatment.

(3.) Holding tanks collecting waste from shower rooms and toilets provide decontamination by heat or chemical disinfectant methods. _

Similar requirements for BL-3/2/1 laboratories are not identified.

d. The Fort Detrick Design Criteria Volume I (Sept 1992) and Volume II (March 1991) recommends the following for Microbiological facilities:

(1.) Wastewater: Biohazardous sewage is collected by the biohazard sewage line (LSS) from BL-3 and BL-4 biohazard areas. Sewage from other areas may be discharged into the LSS on the sole basis of engineering considerations of convenience and cost. Toilets, laboratories and shower drains in biohazard change rooms may normally drain to the sanitary sewer system. Drains from air conditioning units and cooling towers shall discharge to the sanitary sewer or the LSS. Drains from HEPA filters shall be connected to the LSS. Sterilizer wastewater will discharge to the LSS. BL-2 and BL-3 infectious liquid or waste are decontaminated before disposal. BL-4 sewage is heat or chemically disinfected (Volume 11, Page 1.26).

(2.) Airflow: Laboratories designated BL-2, BL-3 or BL-4 are biohazard laboratories or spaces, and shall be designed to utilize 100% outside air with no recirculation. These spaces shall be maintained under negative pressure.

(3.) Sewer line venting: The majority of biohazardous waste lines such as from-BL-2 and BL-3 lab areas may be safely vented to the atmosphere without filtration. Vents from waste lines carrying highly toxic or infectious material, such as from BL-4 lab areas, fermentors and waste collection treatment tanks, must be routed to the Biohazardous Filtered Vent (BFV) system. Vent line filters are required for all BL-4 lab area vent lines. Waste collection treatment units and certain plumbing vents will be connected to the BFV system.

(4.) Waste collection treatment units: When large amounts of infectious material is to be disposed of, a waste collection treatment unit shall be used to sterilize the wastewater before discharge to the LSS. A local waste collection treatment system is not needed in a building in which the largest unit container is equivalent to five gallons of concentrated microorganisms. Descriptions and criteria of batch sterilization, pasteurization, and continuous flow heat exchange sterilization systems are provided.

e. USAMRIID Regulation Autoclave and Waste Management Procedures 385-6*, 1 Nov 1990 indicates that all waste shall be autoclaved when it leaves a biocontainment area, and all waste from BL-4 containment areas will be autoclaved twice. USAMRIID Policy 90-02, 5 July 1990 provides policy on disposal of Biohazardous Waste. USAMRIID Regulation 385-3, Microbiological Safety, 1 Nov 1990, provides policy and responsibilities. USAMRIID Regulation 385-69 1 March 1995, provides specific information on BL-3 and BL-4 Biocontainment Laboratory operations. The regulation requires BL-3 and BL-4 laboratories with floor, sink and safety cabinet drains tied into the central sewer system (LSS) to be flooded with water or disinfectant at least weekly.

f. DSE requested CDC clarify if treated/decontaminated BL-3 wastes need additional decontamination prior to discharge to the sanitary sewer. DSE also asked if untreated liquid BL-3 waste can be discharged to a sanitary sewer. CDC responded with the following information: The CDC/NIH Guideline Biosafety in Microbiological and Biomedical Laboratories requires that all infectious waste from BSL-3 and ABSL-3 facilities be decontaminated by autoclaving, chemical means, incineration or other approved methods prior to disposal. There is no requirement to decontaminate water from hand-washing sinks or showers in BSL-3 or ABSL-3 facilities. CDC does not batch-treat waste water from BSL-3 or ABSL-3 hand washing sinks or showers prior to release into the sanitary sewer (5 Oct 95).

g. COMAR 10.06.06 identifies Maryland handling, treatment and disposal requirements of special medical waste. COMAR 26.13.11-13 identifies special medical wastes, and standards applicable to generators and transporters of special medical waste. No specific disposal requirements for BL-1 through BL-4 wastewater are identified in the above regulations.

h. AR 385-69, Biological Defense Safety Program, 31 Dec 93, identifies the requirement to conduct a Hazard Analysis that includes consideration of the most credible event for major modifications or new construction of Biological Defense Program facilities. Disposal of etiologic agent waste must comply with Federal, State, and local regulations as well as DoD and Army requirements.

i. NCI memo or meeting input: NCI indicates that NCI waste disposal procedures are in compliance with applicable Federal and State environmental regulations. NCI indicates that NCI connection to the LSS and SSP is based on the transfer of buildings to the NCI from the Army, and not scientific need. NCI indicates that all NCI-FCRDC laboratories subject to registration for work with pathogens or recombinant DNA are formally inspected every 6 months by NCI Safety and Environmental Protection. Proper decontamination and disposal of wastes is an issue which is verified during each inspection. In addition any new BL-3 NCI laboratory is inspected and certified by NCI Safety before any research is initiated. This includes verifying the method used to decontaminate any biological wastes generated by the operations in the laboratory.

j. The reference, A Commanders Guide to Infectious Waste Management at Army Health Care Facilities, February 1990, provides information on infectious waste treatment alternatives and indicates that liquid and pathological wastes should be disposed of in a sanitary sewer only if the receiving plant provides secondary treatment and if regulation permits.

k. The EPA Guide For Infectious Waste Management, May 1986 provides the following: -

(1.) Information on infectious waste characterization, management and treatment technologies.

(2.) Recommends discharge of treated infectious liquids and ground up solids to the sewer system.

(3.) A description of the batch treatment process and the continuous treatment process for liquid infectious wastes.

l. Army Environmental Hygiene Agency TG-147, May 1986, provides guidance on management and disposal of laboratory solvents and reagents that have contacted human or animal tissues. -

m. The World Health Organization Laboratory Biosafety Manual, 1993, provides information on laboratory facilities, practices and techniques. The manual indicates that BL-3 liquid effluents will be discharged directly to the sanitary sewer, and BL-4 fluid effluents, including shower water must be rendered safe before final discharge.

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December 18, 1996

APPENDIX C

History of the LSS and the SSP

1. Purpose: To provide information regarding the history of the LSS and steam sterilization plant (SSP): Year constructed, construction materials, cost, use from original construction to the present, significant repairs, previous studies concerning disconnecting buildings from the SSP, etc.

2. Facts:

a. LSS/SSP History and Construction:

(1.) The SSP was originally constructed in 1953 at a cost of $1,334,412 and expanded in 1957 at a cost of $480,000. According to real property records the LSS was constructed in sections in 1949, 1952, 1953, 1954, 1956, 1969, and 1972 at a total cost of $312,500. Construction was accomplished by various contractors. The LSS consists of approximately 20,000 feet of underground piping ranging from 2" in diameter to 12" in diameter. Pipe is primarily cast iron with leaded bell and spigot joints with the exception of building connections accomplished in the last 5 years. These building connections are constructed using ductile iron pipe with mechanical (stuffing box) type joints. Property records indicate the construction of some wrought iron lines, 1500' of steel lines in 1953 and some concrete lines in 1956. All steel lines are thought to have been removed from service and abandoned in years past, and no active concrete lines are known to exist. The LSS lines to the SSP are all gravity flow. Practice has been that LSS lines are encased in a minimum of 6 inches of unreinforced concrete on all sides of the pipe, however, lines have been found unencased in the Building 522, 427 and Building 325 areas in 1994. In addition reinforced concrete has been specified in some unstable locations. Concrete encasement serves as physical protection and an identification means for the lines. The LSS has no manholes, however there are approximately 125 cleanouts. Cleanouts are threaded plugs inserted in an appropriate female fitting leaded into a pipe bell at ground surface. Access to the LSS is also available through indoor floor drains and cleanouts, vent pipes on building roofs and at one known point where the LSS passes through a concrete manhole. Approximate sizes and lengths of LSS mains are provided below:

SIZE (in)	LENGTH (ft.)
2	20
4	1035
6	5055
8	7580
10	3425
12	2545
TOTAL	19660

In addition to the LSS mains there is approximately 4975 feet of laterals to individual buildings. The total LSS length (exterior to building envelopes) is 24635 feet. The predicted lifetime of the LSS (based on cast iron piping encased in concrete) is approximately 75 years.

(2.) In prior years, research buildings on post had their own individual blowcases. After laboratory sewage was sterilized in the blowcases, it was discharged into the sanitary sewage system. Blowcases were taken out of service over a number of years as an efficiency initiative to reduce maintenance requirements. No operational blowcases are known to exist, however an improved design blowcase is presently being installed in NCI Bldg. 459 to sterilize process wastewater prior to discharge to the LSS (see Appendix B). In addition an abandoned blowcase is located in Bldg. 390.

(3.) Buildings known to be connected to the LSS as of this date are: 313, 314, 321, 325, 374, 376, 393, 427, 428, 429, 430, 431, 432, 433, 434, 459, 469, 472, 522, 524, 535, 538, 539, 550, 560, 567, 571, 1412, and 1425. Other buildings in the 200, 500, and 600 areas of post are known to have been connected to the system during biological warfare research activities at Fort Detrick. Buildings with LSS and sanitary sewer service are: 325, 374, 376, 393, 431, 432, 459, 469, 472, 535, 538, 539, 550, 560, 567, 571, 1412, and 1425. Buildings with LSS service only are: 313, 314, 321, 427, 428, 429, 430, 433, 434, 522, and 524. Buildings with LSS connections and administrative operations only are 427, 428, 430, and, 524.

(4.) The SSP is intended to be used as a secondary system or backup treatment system to disinfection processes in place in the laboratories. Although intended to be used as a secondary system, wastewater from USDA containment areas in Building 374 is not treated prior to discharge to the LSS. The SSP operates on a 24 hour basis year round with the exception of the annual one day steam outage in June. During the steam outage wastewater is stored in the SSP storage tanks until steam service is restored.

b. LSS Maintenance and Studies:

(1.) Known maintenance conducted on LSS lines exterior to buildings consists of replacement of lines from the SSP to the above ground storage tanks. (These lines were replaced in 1991, and currently consist of a new 8" welded steel supply pipe in a concrete trench, and a 10" double wall direct burial return line which runs parallel to the concrete trench In addition a new 10" welded steel line was placed in the trench and capped off. This line is a spare and could be used in the future if required.) Other known maintenance to the LSS is the replacement of cleanout caps. Damage to cleanout caps is believed to have been caused by lawnmowers. Several cleanout caps have been replaced over the years, including 4 or 5 which were replaced during the Hydro Geo Chem study.

(2.) Many tie-ins to the LSS have been made over the years. Numerous connections at Building 1425 were made due to lab renovations in 1988-1993. The NCI, as part of various building renovations, has requested and accomplished connections via Army (DPW) personnel making final connections into the system with NCI/contractor furnished hardware. Connections/dates include; Building 472 - 1993, Bldg. 535 - 1995, Bldg. 321 - 1995, Bldg. 430 -1995, Bldg. 567- 1994, Bldg. 459 - 1995 and Bldg. 325 - 1982. The NCI performs maintenance on the sewer lines located within their buildings.

(3.) In 1972 laboratory buildings and building lines were chemically disinfected due to the requirement of demilitarizing the biological warfare effort. Disinfectant was pumped into building lines up to the roofs, and then allowed to drain through the LSS to the SSP. In 1978 the exterior above ground SSP holding tanks were drained. The sludge was tested and found to contain Anthrax. The sludge was decontaminated and disposed of at the Fort Detrick Landfill. In 1988 the tanks were again drained, and the sludge was tested and did not contain Anthrax.

(4.) NCI has conducted numerous studies dating back as far as 1977, to remove either all or some of the NCI buildings from the SSP. A feasibility report dated 9 September 1994, identifies two options. Option A reroutes some buildings from the LSS to the sanitary sewer at a cost of $211 K. Option B reroutes all NCI buildings, currently connected to the LSS, **from the** LSS to the sanitary sewer at a cost of $218K. Payback in energy costs alone is estimated at 1 year. Payback to NCI (assuming decreased Interservice Support Agreement costs), is less than one year.

(5.) In 1990 NCI indicated they had found deteriorated LSS piping under floor slabs of some buildings. This lead to the LSS study being programmed. No previous testing of the system is known to have taken place. In May of 1991 Woodward-Clyde Federal Services was contracted to study various LSS testing methodologies and, after selection of an acceptable approach, develop contract documents for the actual testing. After investigating testing approaches, a soil gas analysis technique was selected due to its sensitivity, ability to detect gas and liquid leaks, its lack of environmental impact and its ability to be conducted without disruption of LSS service. In September 1993, a contract was awarded to Hydro Geo Chem of Tucson, AZ to accomplish the testing. A final testing report was completed in Jan 1995.

(6.) In 1993 and 1994, NCI used TV cameras to investigate the condition of LSS lines under buildings 538, 539, and 560. Evidence of failure of waste lines that discharge to the LSS was identified in each building. Pipes inspected were cast iron with bell and spigot connections. There was no concrete encasement, and pipes were buried under concrete slabs. Pipe failure was believed to have been caused by differential pipe settlement. In addition deteriorated pipe was found in Building 539 and 560. Most sections of lines that had failed have been repaired with cast iron bell and spigot pipe. In Building 538 a project is being designed to repair the pipe. Duriron (acid resistant pipe of cast iron and silica) will be used. In the 1970 time frame severely deteriorated pipe was found in Building 539. The pipe was replaced with cast iron bell and spigot pipe. Other NCI buildings which have had significant pipe repairs are Buildings 325 and 429 where drain traps have failed and been replaced.

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August 15, 1996

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ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION OF TWO STERILIZATION FACILITIES,
CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND
DEACTIVATION OF THE STEAM STERILIZATION PLANT
UNITED STATES ARMY GARRISON, FORT DETRICK, MARYLAND

APPENDIX D

SSP Operation

1. Purpose: To provide information regarding SSP operation: Overview of how the SSP works. Also indicate what is known about where SSP influent comes from and where effluent discharges. Hours of operation, flow rates, any metering/testing of influent.

2. Facts:

a. Operation:

(1.) The SSP operates on a 24 hour year round basis, with the exception of the annual one day steam outage in June. Influent to the SSP is considered potentially contaminated and is primarily generated by three Fort Detrick tenants, NCI, USDA, and USAMRIID. Influent to the SSP flows by gravity through eight communicators (four in use at a time) to six below grade 50,000 gallon holding tanks in the basement of the SSP (Bldg 375). From these tanks wastewater is pumped to nine exterior above ground 50,000 gallon holding tanks. The above ground tanks are contained within a concrete basin for spill protection. From these tanks the wastewater flows back to the SSP by gravity where it is pumped through heat exchangers into the steam sterilizers. There are four steam sterilizers. Each steam sterilizer contains a unit called heat retention tubes. This unit is equipped with a steam injector which injects the proper amount of steam (usually 20-100 lbs. depending on flow rate) into the wastewater to maintain a wastewater temperature of 270 degrees F. This temperature is maintained at 270 degrees for a minimum of 11 minutes on systems #2 and #3, and 20 minutes on systems #1 and #4. The difference in retention times is due to the length of piping in the respective systems. If a minimum wastewater temperature of 250 degrees is not maintained throughout the heat retention tubes, the sewage pumps on that system will automatically shutdown. After passing through the heat retention tubes, the wastewater is again passed through heat exchangers prior to discharge to the sanitary sewer at a temperature between 110 and 135 degrees F. A file containing operating procedures of the SSP is dated 28 Sept 95. A June 9, 1989 memorandum describes the SSP design and provides flowcharts.

(2.) The SSP consists of four independent sterilization systems, each capable of sterilizing 200 GPM (288K GPD). Typically one of the systems is having maintenance performed and is not operational, one system is treating the wastewater, and the two remaining systems are operational but not in use. A system which is not in use but is operational can be brought on line in 2 hours. Minimum flow per unit is 100 GPM. If average flow would go below this threshold the system in use would be put on standby until wastewater accumulates in the holding tanks. SSP effluent is tested for E. Coli every eight hours. The COLILERT method is used. A positive or negative result is indicated. There has never been a positive E. Coli test result since the commencement of the COLILERT method.

(3.) Treated effluent from the SSP is discharged to the Fort Detrick sanitary sewer system, which discharges to the Fort Detrick sanitary sewage treatment plant located off of the main post. The wastewater treatment plant discharges to the Monocacy River per an **NPDES** permit. Effluent parameters tested under the current NPDES permit are BOD, suspended solids, TKN, fecal coliform, total residual chlorine, dissolved oxygen, pH and flow. There are no recorded exceedences of the permit limitations.

b. Flows:

(1.) In 1994 the SSP treated 87 MG of wastewater. Over the last ten years, flows to the SSP have ranged from 75 MG in 1985 to 98 MG in 1992. On a monthly basis flows vary significantly. In 1994 monthly flows varied from 4.7 MG (average .17MGD) in February, to 11.7 MG (average .38MGD) in August. This increase in flow is potentially from air conditioning condensate and cooling water. Air conditioning condensate and cooling water are not normally required to be discharged to the LSS unless they come in contact with air from containment areas of laboratories. The SSP has a rated capacity of 1.15 MGD. Tank level readings are taken on an hourly basis for all the tanks. Tank level readings taken at midnight are used to calculate flow into the SSP. SSP flow is also measured by a flowmeter located after the pump which pumps untreated wastewater through the heat exchangers. Wastewater treated at the SSP is discharged to the sanitary sewer system and the sanitary sewage treatment plant. The Fort Detrick sanitary sewage treatment plant has a capacity of 2 MGD. Daily flows range from 1.2 MGD in the summer to .7 MGD in the winter.

(2.) Rainfall and SSP influent data has been reviewed for the months of April thru May 1995. Based on this review there is no significant amount of rainwater entering the SSP. Rainwater collected in the SSP above ground storage containment area is pumped into the above ground storage tanks. This additional influent to the SSP is estimated to be 200,000 gallons per year. In addition a sump pump in the basement of the SSP pumps an unknown quantity of groundwater into the SSP storage tanks. The Fort Detrick incinerator, Building 393 discharges wastewater from the can washer to the LSS. Wastewater is discharged to the LSS approximately one time every six months. Quantity discharged is estimated at 300 gallons to 600 gallons per six month period.

(3.) A Sept/Oct 1995 analysis of flows from individual tenants resulted in the following estimated average daily flows from individual tenants/organizations:

NCI:	74,000 GPD
USAMRIID:	45,000 GPD
USDA:	4,500 GPD (July)
MRDC (Breast Cancer):	850 GPD
TOTAL	124,350 GPD

This estimated total flow represents an amount significantly less than the measured flow at the SSP. For comparison the average daily flow in 1994 was 238,000 GPD. The source of not accounted for flow, is unknown at this point.

c. Ventilation of the SSP and LSS:

(1.) Exhaust air from the SSP six below grade holding tanks and nine above ground holding tanks is discharged to the atmosphere through HEPA "Dollinger" filters. Other exhaust air from the SSP is not HEPA filtered. There is no exhaust or supply air for retention tube and heat exchanger rooms. The one exception is in system #3 heat exchanger room, which has an exhaust fan. The SSP room which contains the below ground holding tanks has two exhaust fans. Two air handling units with supply and exhaust, handle the rest of the building.

(2.) Some USAMRIID drain lines which discharge to the LSS have vent lines installed. BL-3 vent lines do not have HEPA filters. BL-4 vent lines have HEPA filters. USAMRIID

Regulation 385-69 requires BL-3 and BL-4 laboratories with floor, sink and safety cabinet drains tied into the central sewer system (LSS) to be flooded with water or disinfectant at least weekly.

(3.) Older NCI buildings may have drain lines which discharge to the LSS without proper venting. NCI buildings renovated within the last several years have been properly vented. Building 459 has the drain vent line hooked to a HEPA filter. NCI has encountered problems where LSS traps in buildings have not been filled.

(4.) The USDA Building 374 drains to the LSS are not vented.

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December 18, 1996

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APPENDIX E

SSP Influent

1. Purpose: To provide information regarding the SSP influent.

2. Facts:

a. Influent to the SSP is considered potentially contaminated and is primarily generated by three Fort Detrick tenants, NCI, USDA, and USAMRIID. Licenses with the Nuclear Regulatory Commission do not permit the discharge of radioactive chemicals into the LSS. Hazardous laboratory wastes, such as organic solvents and chemicals that are toxic, carcinogenic, corrosive, ignitable, or reactive, are not discharged into the LSS. Some conventional sanitary sewage discharges into the LSS from some buildings. In addition a large quantity of air conditioning condensate may discharge to the LSS.

b. USDA provided a list of fungi/bacteria/viruses being studied in Building 374 (13 Oct 94). NCI provided a list of infectious agents/toxins toxins in use (15 94). 94). A list of viruses stored at USAMRIID is dated 6 July 92.

c. USAMRIID provided MSDS for detergents and acid (phosphoric) currently used in the glassware machines (15 May 95). USAMRIID provided an MSDS for the disinfectant Microchem (4 Oct 95). NCI provided MSDS for three cleaning agents used in their labs (3 Oct 95)

d. Letters dated 8 August 95 were sent to NCI, USAMRIID, USDA, and USABRDL requesting detailed information on their current and future discharges to the LSS, and BL-3/4 discharges to the sanitary sewer system.

(1.) NCI provided a detailed response that includes numbers, types, locations and flow quantities of point source discharges to the LSS. Biological and chemical wastes discharged to the LSS from BL-3 laboratories were also identified. Requirements for future discharges to the LSS were identified. NCI also responded to the request by indicating that all NCI-FCRDC containment laboratories were recertified in accordance to requirements. NCI also indicated they have no BL-4 laboratories, and do not anticipate getting any BL-4 laboratories.

(2.) USDA provided flow quantities discharged from individual point sources to the LSS. USDA also indicated that biological and hazardous waste discharge to the LSS is minimal, and there are no anticipated changes to the current discharge.

(3.) USAMRIID provided locations, numbers, and types of individual point source discharges to the LSS.

(4.) USABRDL is no longer connected to the LSS, and has no anticipated future need for the LSS.

e. A protocol for NCI laboratory operations is dated 14 April 95. A listing of NCI containment laboratories with potential hazards, an audit schedule, and a safety inspection checklist is dated 24 May, 1996.

f. The Fort Detrick incinerator, Building 393 discharges wastewater from the can washer to the LSS. Wastewater is discharged to the LSS approximately one time every six months. Quantity discharged is estimated at 300 gallons to 600 gallons per six month period. In addition the MRMC Building 524 discharges approximately 850 gallons per day of sanitary wastewater to the LSS. Also, rainwater collected in the SSP above ground storage containment area is pumped into the above ground storage tanks. This additional influent to the SSP is estimated to be 200,000 gallons per year. In addition a sump pump in the basement of the SSP, pumps an unknown quantity of groundwater into the SSP storage tanks.

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APPENDIX F

SSP Operating Costs

1. Purpose: To provide operating costs for the SSP and the LSS. Detailed yearly operating costs, manpower requirements, distribution of costs to tenants, discuss ISSA's, etc.

2. Facts:

a. Operating costs:

(1.) Operating costs for the LSS/SSP for FY 94 were:

Labor	$387,687.50
Plant supplies	28,456.50
Maintenance & repair	106,283.00
Energy	268 607 00
	$791,034.00

Operating costs could vary significantly from year to year due to the variable nature of maintenance and repair costs. Significant recent projects include Replace Heat Exchangers, $1684K, FY 93; Rewire Building 375, $899K, FY 94 (not included in above costs); and Replace Above Ground Piping, $40K, FY 91. In addition, SSP operators are dispatched to investigate and correct emergency trouble calls during off duty hours. The estimated cost to provide this service is $261,705 per year (not included in above costs).

(2.) The cost per million gallons to operate the SSP is $8940 for FY 94, and the average cost for the last ten years is $8420 per million gallons. In comparison, the cost per million gallons to operate the Fort Detrick sanitary wastewater treatment plant is $1032. Wastewater which is treated by the SSP is discharged to the sanitary sewage system and treated by the sanitary sewage wastewater treatment plant.

b. Distribution of costs:

(1.) Costs are distributed to tenants based on the estimated wastewater discharge to the LSS. These costs are identified in the Interservice Support Agreements (ISSA). ISSA's are updated/renegotiated on a yearly basis. The FY 94 cost splits were 72% for NCI, 26% for USAMRIID, and 2% for USDA. MRDC (Building 524) is not charged for treatment of their wastewater at the SSP.

(2.) A spreadsheet which identifies tenant reimbursements for SSP operations and maintenance costs is provided below. These reimbursements do not include reimbursements which Fort Detrick received for energy costs associated with the SSP.

	FY 94 $K (actual)	FY 95 $K (actual)	FY 96 $K (actual)
NCI	395.5	339.3	266.6
USAMRIID	143.7	172.7	131.6
USDA	9.7	10.8	8.0
Total	**548.9**	**522.8**	**406.2**

(3.) LSS costs funded with U.S. Army environmental funds are not normally prorated to, or reimbursed by the tenants.

c. Manpower Requirements: 16 personnel are currently assigned to the steam sterilization plant and special operations section. 6 personnel are required to operate the SSP on a full time 24 hour basis (with either one or four systems on line). Maintaining the SSP requires additional personnel. Of the 16 personnel assigned to the SSP and special operations, approximately 40% of their total time is spent on duties not associated with the SSP such as routine patrols and trouble calls. 60% of the 16 personnel's time is spent on SSP operations and maintenance.

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January 23, 1997

ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION OF TWO STERILIZATION FACILITIES, CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND DEACTIVATION OF THE STEAM STERILIZATION PLANT
UNITED STATES ARMY GARRISON, FORT DETRICK, MARYLAND

APPENDIX G

LSS Survey

1. Purpose: To provide information regarding the LSS survey: Why was it requested, phases, costs, overview of results, etc.

2. Facts:

a. In July of 1990 NCI discussed with the Fort Detrick Commander that deteriorated LSS lines had been found under NCI buildings. This lead to the LSS study being programmed.

b. In February 1991 DPW requested the Baltimore District obtain an AE to recommend a LSS testing method and prepare drawings and specifications ($3K environmental funds sent to COE). In April of 1991 DPW approved a COE scope of AE services and requested the COE proceed with negotiations. $75K of environmental funds were sent to the COE in June of 1991 to fund the feasibility study and preparation of the drawings and specifications. An additional $5K was sent to the COE in FY 92 for COE services.

c. The COE awarded the contract for the feasibility study to Woodward-Clyde Federal Services. Woodward-Clyde prepared a report titled A Feasibility Study to Evaluate Alternative Methods to Test the Contaminated Sewer System at Fort Detrick for Leaks: Development of Testing Options, dated 23 December 1991. It identified, screened, and ranked testing alternatives The study concluded that gas testing of the LSS with sulfur hexafluoride (SF6) is the preferred testing method. Woodward-Clyde also prepared specifications and drawings to advertise for the LSS testing and evaluation (using SF6). These specifications are dated 20 April 1992/revised 21 September 1992. The final cost of the feasibility study, specifications and drawings was $75K to Woodward-Clyde and $8K for COE services. Environmental funds were used.

d. In September 1992 there was an unsuccessful attempt to award a contract for LSS testing and evaluation. All bids received were not acceptable. This resulted in no action until late FY 93 when Requests for Proposals were solicited, using modified solicitation documents.

e. On 22 September 1993 a contract to leak test the LSS was awarded to Hydro Geo Chem for $288K. Environmental funds were used (a 29 September 1993 change increased the contract amount to $313K.) $4K of environmental funds was provided to the DPW to support the contract. The investigation was designed to detect any gas leak exceeding .2 milliliters per hour (ml/hr) and any liquid leak exceeding 30 ml/hr. The investigation consisted of injecting the tracer gas (SF6) into the LSS and sampling the soil adjacent to the LSS for the gas. LSS lines under or inside buildings were not tested.

Reports provided by the Hydro Geo Chem, inc. are:

(1.) Phase I Workplan, January 12, 1994, (1994a) Hydro Geo Chem's proposal to modify the specifications and workplan.

(2.) Laboratory Experimental Results, February 3, 1994, (1994b). Provides results of laboratory experiments by Hydro Geo Chem to investigate HEPA filters, SF6 analysis, sample syringe selection, etc.

(3.) Phase I Preliminary Investigation Report, April 15, 1994, (1994c). Determined SF6 background levels in soil and air, and permeability of soil. Injected C02 to ensure the LSS was well vented, and to determine travel time and dilution in the LSS. Tested and refined methods developed during the previous laboratory phase.

(4.) Final Design for Leak Investigation, May 2, 1994, (1994d). Pilot study to verify that testing methods could detect LSS leaks, and confirm suitability of work specifications.

(5.) Final Report for Leak Detection Investigation of Contaminated Sewer System, 3 January 1995.

(6.) Hydro Geo Chem also provided a 28 April 1995 proposal for testing two excavated and exposed sections of the LSS, and to develop a plan to test the LSS in the future.

f. The final report included:

(1.) Results of a geophysical survey to locate the LSS, determine its depth and to determine depth to bedrock. The geophysical survey was also used in conjunction with soil gas sampling results to identify anomalies or possible liquid leaks from the LSS. Ground Penetrating Radar and Electromagnetic Line Location were used. The geophysical survey was conducted by a subcontractor, Detection Services, Inc.

(2.) Results of the measurement of groundwater depth at the bottom of the LSS at 36 locations. No water was encountered during the geophysical survey or during the soil gas survey with the exception of one soil gas probe near Building 375, which came up muddy with clay like soil which may indicate near saturated conditions.

(3.) Results of soil gas samples taken at 783 locations.

g. As a summary of soil gas tests taken the following information is provided:

(1.) The tracer gas (SF6) and a carrier gas (C02) were injected into the LSS at several LSS cleanouts. After a 19 day waiting period soil gas sampling was started. All soil gas sampling was completed 42 days after the initial gas injection. 783 samples were taken, of which 183 were used to further examine potential leak magnitudes and locations. Soil gas samples were taken at 30 foot intervals along the LSS. Soil gas results ranged from below background (.023ng/l to 26,000 ng/l. Background level was determined to be .03 ng/l and Hydro Geo Chem determined that .1 ng/l was a significant level. Approximately 52% of soil gas measurements had a SF6 concentration above 0.1 ng/l. A single LSS leak could have contributed to more than one elevated soil gas reading. Color coded maps which show contours of potential leak areas along the LSS are provided in the report.

(2.) Potential LSS leak estimates were calculated for each sample as if the potential leak was either a gas or a liquid leak. The testing method was unable to differentiate between a gas or liquid leak. This is because the gas detected adjacent to the LSS line may have originated from a gas leak, or it may have leaked out in the LSS liquid and repartitioned into the soil gas. Calculated results assuming either a gas or a liquid leak are presented in the report in table format. In addition, potential leak calculations were significantly impacted by the assumption of what distance from the soil gas sampling probe the potential leak on the LSS is located. These two factors alone (liquid Vs gas leak, and distance to leak) resulted in potential leak estimates for individual soil gas testing locations typically varying by a factor of 100 to 1000. The report recommends that due to these factors and other assumptions which were made, the report should be considered a preliminary phase and used to prioritize areas requiring further investigation (physical inspection or additional leak detection investigations) or possible repair and replacement.

h. 98% of LSS outside of buildings was tested. Drain lines to the LSS under or inside of buildings were not tested. LSS lines from the SSP to the above ground storage tanks and back to the SSP were not tested (these lines were replaced in 1991).

I. Copies of the LSS Survey have been provided to NCI and USAMRIID USDA indicated they do not need a copy of the survey. Copies of the survey report have also been provided to USACHPPM, MEDCOM and AEC.

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August 15, 1996

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APPENDIX H

Actions to Validate the LSS Survey

1. Purpose: To provide information regarding actions that have been or will be taken to validate the LSS survey: Report analysis, visual pipe inspection/repairs, etc.

2. Facts:

a. Report analysis:

(1.) Mr. Toomey from Toomey Engineering prepared a report for LTC McArthur, the DSE, which identified various deficiencies in the LSS study. Mr. Toomey's report concludes that the magnitude of the liquid leak estimates are not scientifically validated in the LSS study, and could lead to the incorrect interpretation that the LSS is in complete failure. Mr. Toomey's report indicates that the LSS study can be used to determine the approximate location of potential liquid leaks.

(2.) The U.S. Army Center for Public Works awarded a contract to a consultant on 11 August 1995 to identify and evaluate LSS/SSP alternatives, and conduct an analysis of the LSS study. The consultants June 1996 report concludes that the LSS survey's test procedures utilized and the manner in which they were employed were scientifically sound and consistent with the objective of finding a gas leak, liquid leak, or combination leak from the LSS. The report also provides justification that favors the conclusion that the majority of SF6 gas detected was from gas leakage and not from liquid leakage from the LSS.

b. Visual pipe inspection:

(1.) A LSS location southeast of Building 350 (site SG-299) was excavated on 20 March 1995. Two cracks were observed in the concrete encasement. There was no evidence of any wet areas on the concrete or adjacent soil at the cracks. The concrete encasement was removed with jackhammers and 19' of 8" cast iron pipe with two leaded joints was inspected. Visual inspection of the pipe revealed no breaks or evidence of leakage. On 29 March the LSS was pressurized with 52" of static head (or 1.9 pounds per square inch[psi.]) One of the lead joints began to leak at a rate of one drop of water every 4 minutes. The joint was repaired after the static head was removed. Potential for soil washout was observed below the exposed LSS line.

(2.) A LSS location east of Building 350 (site SG-646) was excavated on 23 March 1995. The concrete encasement was removed with jackhammers, and the 8" cast iron pipe and cleanout was visually inspected. Three lead solder joints and a wye fitting were exposed. Visual inspection of the pipe revealed no breaks or evidence of leakage. On 3 April the pipe was pressurized with 52" of static head and there was no evidence of leaking. However, the lead joint downstream of the wye showed signs of "weeping" but no drops of water were released from the pipe or joint. The joint stopped weeping on its own, and the joint was tightened as an extra precaution.

(3.) On 13 June 1995, DSE staff inspected the LSS at the two above sites. At the cleanout north of site SG-646, the cleanout cap had been removed and a balloon inflated in the line to block drainage and allow a static head to develop. At 0930 there was approximately 2 feet of head (measured from centerline of pipe to water elevation visible in cleanout) at site SG-646. The pipe and joints at SG 2991646 were inspected and there we no leaks. At 1130 there was approximately 4.5 feet of head at site SG-646. Exposed pipe and joints were **visibly** inspected. There was no evidence of leaking with the exception of the south bell joint at site

SG-299. This was the same joint which previously leaked (March 1995) when pressurized. The joint was leaking at a rate of one drop per 25 seconds. The leak was from the bottom of the joint. This joint was repaired by the DPW plumbing shop, visually inspected under atmospheric conditions over several days, and pressure tested to ensure the joint was sound. This joint was not encased in concrete due to the need to provide a new NCI connection. Other portions of the LSS at sites SG-299/646 were encased in concrete, and the earth cover/fill was placed. Concrete removed from the LSS was disposed of at the Fort Detrick landfill. Soil removed during the excavation was used to fill the excavation.

(4.) Pressurizing the pipe is considered a worst case condition. Under normal operation the pipe would be under atmospheric pressure only.

(5.) An additional LSS location north of Bldg. 350 may be excavated (tentative) and exposed. This location is considered to have the highest potential for liquid leaks based on the Hydro Geo Chem report.

c. At DPW's request Hydro Geo Chem submitted a proposal to test two sections of the LSS which were excavated and exposed. The April 1995 proposal identified helium as the tracer gas to be used. The proposal cost was $15,790. It was also proposed that the helium test in conjunction with a liquid (fluorescent dye) test might be used at a cost not to exceed $28,000. Hydro Geo Chem also proposed to do both the helium and fluorescent testing, and develop a plan for evaluating repairs and long term monitoring of the LSS condition. The total cost for this proposal was $38,400.

d. In September 1992 Fort Detrick received a proposal from Tracer Research Corp. in response to Fort Detrick's solicitation. They recommend SF6 not be used for the LSS survey due to its extremely volatile characteristics, the sensitive analytical methods required, and the inability to completely seal the LSS. They indicated that if SF6 is used there is a good chance that it will be detected at every sampling location and will cause unnecessary ambiguities. Tracer Research then recommended use of a tracer which they developed called "Tracer D."

e. The CHPPM is conducting a Health Risk Evaluation of the LSS. Soil and groundwater samples have been taken adjacent to the LSS at the three locations that have the highest SF6 measurements identified in the LSS survey. Based on chemical analysis results from the soil and groundwater, CHPPM's draft report concludes that the LSS is leaking wastewater at all three locations Additional sampling and analysis would be conducted to determine the health risks and complete the HRE.

f. A dewatering well east of Building 350 and approximately twenty feet east of SG-646 was installed in the late 1950's for the purpose of capturing and removing ground water. The ground water was pumped into the storm sewer. Estimated flows vary from 800 gpd during a recent drought to 8200 gpd during a rainfall event. In August 1995 the well water was tested for fecal coliform, and the results were 23 mph/100ml and 2 CFU/100ml. Two wellwater samples (split samples) were also tested for metals and volatiles with the following significant results: chloroform (12 and 12 μg/l), methylene chloride (12 and 10 μg/l). trichloroethylene (8 and 8 μg/l.) Phosphate, sodium and calcium levels were also measured and correspond closely to groundwater, and are quite different from Fort Detrick sewage. On 22 September 1995 the MDOE was advised of the testing results and Fort Detrick's intent to discharge the wellwater to the sanitary sewer. The wellwater discharge was subsequently rerouted to the sanitary sewer.

Rod Sheffer
Environmental Engineer
MCHD-SHE
August 15, 1996

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ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION OF TWO STERILIZATION FACILITIES, CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND DEACTIVATION OF THE STEAM STERILIZATION PLANT UNITED STATES ARMY GARRISON, FORT DETRICK, MARYLAND

APPENDIX I

Other U.S. Army Agency Involvement

1. Purpose: To provide information on other U S. Army agency involvement: CHPPM (ECAS and other requests for services), CPW, Safety Center, MEDCOM, others.

2. Facts:

a. On 26 May 1995 Fort Detrick requested CHPPM conduct a Health Risk Assessment to evaluate health risk to employees and the public if the LSS system is continued to be used in its current condition. On 20 July a CL PPM team visited Fort Detrick and discussed influent to the LSS with the tenants and Fort Detrick employees. CHPPM returned to Fort Detrick on 29 September to obtain information from USDA, NCI and USAMRIID regarding their discharges to the LSS. Soil samples were taken in areas of high potential LSS leak areas in October 1995. Wastewater samples from the LSS were also taken. In November 1995 CHPPM installed four groundwater monitoring wells adjacent to the LSS at locations with the highest potential for LSS leaks. Groundwater samples were taken in December 1995. On 16 April 1996 a draft Health Risk Evaluation was received from CHPPM. The draft report indicated that based on the chemical analysis results from the soil and groundwater, the LSS is leaking wastewater into the soil and groundwater at each of the sites studied. The draft report recommended that CHPPM conduct additional sampling to conclude the HRE. Additional LSS wastewater samples were taken in June 1996, and additional groundwater samples adjacent to the LSS were taken in July 1996. On 29 October 1996 a second draft Health Risk Evaluation was received. The draft report indicates there is sufficient evidence at each study site to conclude that wastewater is leaking from the LSS into the subsurface soil. There is insufficient evidence to conclude that LSS wastewater leaks into the subsurface soil are leaching into the groundwater below the sites. The draft report also indicates there are no current health risks. There are no current exposures to impacted soils. There are no current health risks from LSS contents which were thought to be potentially impacting ground water. Future site excavation workers are the only individuals potentially exposed to these soils. CHPPM intends to complete the HRE by December 1996.

b. CHPPM conducted an Environmental Compliance Assessment System (ECAS) inspection at Fort Detrick in April 1995. They were briefed on the LSS situation and had no findings regarding the LSS or the Steam Sterilization Plant.

c. U.S. Army Center for Public Works (CPW) has consultants on board to provide services on a reimbursable basis. A contract was awarded through CPW to a consultant to evaluate LSS feasible alternatives and the Hydro Geo Chem Report. The final report was received in June 1996 (see Appendix L).

d. AEC assistance may be available through onboard environmental contractors. Information on the LSS project has been sent to AEC.

e. The MEDCOM Environmental Office was briefed on the LSS and provided a copy of the LSS Survey in May 1995. On 29 August 1995 the MEDCOM Environmental Office was provided draft information papers on the LSS. In July 1996 the MEDCOM was provided draft information papers and the CPW consultant's study.

f. POC's have been established at Dugway, CHPPM, CPW, U.S. Army Medical Research and Materiel Command and USABRDL.

Rod Sheffer
Environmental Engineer
MCHD-SHE
Novembers, 1996

APPENDIX J

Protocol for LSS Digs

1. Purpose: Provide a safety protocol or SOP which would be used for LSS excavations.

2. Facts:

a. Previous excavations:

(1.) Excavations at USDA LSS: Excavations were made at two sections of the LSS dedicated to USDA operations. This was done in an attempt to validate the results of the LSS Hydro Geo Chem LSS survey. Due to the line being dedicated to USDA (plant pathogen research) there are no human pathogens in the line. it was determined that no special precautions such as protective clothing or respirators were required. The line was flushed with sodium hypochlorite prior to the excavation. If a wet area in the dirt or LSS concrete encasement would have been found, sodium hypochlorite would have been used to disinfect the wet area.

(2.) Excavations for NCI LSS tie-ins: In prior years there have been several times when new LSS tie-ins for NCI operations were completed. At these locations the earth excavation and removal of the concrete encasement was completed by a contractor. If the contractor would have found wet areas they would have informed the pipe shop of the DPW. No protective measures were taken by the contractor. The evening prior to the "tie-in" sodium hypochlorite was poured into the LSS drains in each building that drained into the portion of the LSS being worked on. The water to those buildings was fumed off to minimize LSS flow. The tie-ins usually occurred on Saturday and were accomplished by DPW. Protective clothing and respirators have been worn in instances where a potential hazard might have existed. The LSS line was cut and an inflatable balloon was installed in the line upstream from the cut. The inside of the line at the tie-in was chemically disinfected. Sections of the LSS removed were autoclaved at the SSP.

(3.) A detailed SOP to excavate and tie into the LSS for the Building 472 remodeling project is dated 24 November 1993.

(4.) A 14 July 1995 draft protocol for future LSS tie-ins has been prepared by DSE.

b. An NCI protocol for work on contaminated sewage lines inside building envelopes has been developed (December 1994.) A protocol for use by Installation Restoration personnel to investigate contaminated sites is dated November 1990.

c. Risks associated with work on LSS lines are evaluated based on the individual location where work will be done, and the type of work which will be performed. Pathways of transmission of hazards could include aerosol and direct contact with skin. In the past, coordination with USAMRIID has provided the proper materials and assistance to determine the presence or absence of anthrax.

d. Sampling plans for taking soil and groundwater samples adjacent to the LSS, and wastewater samples from the LSS, are dated October 1995, and were developed by CHPPM.

Rod Sheffer
Environmental Engineer
MCHD-SHE
August 15, 1996

APPENDIX K

Consultant Assistance

1. Purpose: Discuss the need for private consultants or organizations outside Fort Detrick to provide services to assist in resolving the LSS project.

2. Facts:

a. Obtaining assistance from private consultants or organizations outside of Ft. Detrick will help ease any concern that Fort Detrick is operating in a vacuum. The following outside assistance has been provided or is in progress.

(1.) A private consultant conducted a feasibility study to evaluate LSS alternatives and to evaluate the Hydro Geo Chem Study. A final report was provided in June 1996 (see Appendix L).

(2.) CHPPM is conducting a risk evaluation of the continued use of the LSS (see Appendix I).

(3.) A Bio-Assessment Advisory Group (BAG) meeting was convened in May 1996. The BAG consisted of six Bio-Safety experts not employed on Fort Detrick. The BAG's purpose was to provide recommendations regarding the LSS/SSP project. Minutes from the meeting are attached.

Rod Sheffer
Environmental Engineer
MCHD-SHE
August 15, 1996

DEPARTMENT OF THE ARMY
HEADQUARTERS, FORT DETRICK
FREDERICK, MARYLAND 21702-5000

MCHD-SHE 17 June, 1996

Bio-Assessment Advisory Group (BAG) Minutes

1. Bio-Assessment Advisory Group meetings were held 29 and 30 May 1996, at Building 925 Fort Detrick, Frederick, MD.

2. Attendees for all or part of the meetings were:

Mr. Manuel S. Barbeito, BAG Member
Dr. Emmett Barkley, BAG Member
Mr. Ralph Kuehne, BAG Member
Dr. Robert McKinney, BAG Member
Mr. Joseph Songer, BAG Member
Dr. Jerry J. Tulis, BAG Member
COL Henry O. Tuell III, Commander, U. S. Army Garrison (USAG), Fort Detrick
COL David Franz, Commander, U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID)
COL Gerald Parker, Deputy Commander, USAMRIID
LTC Alan Sheaffer, USAG, Director of Safety and Environment (DSE)
Dr. Carol Linden, USAMRIID, Chief of Research Plans and Programs
Mr. Tom Farrell, USAMRIID, Chief of Logistics Division
Dr. Robert Hawley, USAMRIID, Safety and Occupational Health Specialist
Mr. Richard Carter, Deputy General Manager, National Cancer Institute Frederick Cancer Research and Development Center (NCI-FCRDC)
Dr. Randall Morin, NCI-FCRDC, Science Applications International Corporation (SAIC)
Mr. Don Smith, USAMRIID, Chief of Building Engineering Branch
Mr. Tom Franklin, U. S. Department of Agriculture (USDA), Area Environmental Specialist
Dr. William Bruckart, USDA, Research Plant Pathologist
Mr. Norm Covert, USAG, Chief of Public Affairs Office
Dr. Henry Erbes, USAG, DSE, Chief of Environmental Management Division
Mr. Rudy Spencer, USAG, DSE, Installation Safety Manager
Mr. Bill Brubaker, USAG, DSE, Safety Specialist
Mr. Rod Sheffer, USAG, DSE, Environmental Engineer

3. LTC Sheaffer opened the meeting by welcoming everyone and asking them to introduce themselves. He then thanked everyone for attending and provided an overview of the purpose of the BAG. The purpose of the BAG is to provide recommendations regarding the need for the Steam Sterilization Plant (or alternate facility) for the treatment of laboratory wastewater from the individual Fort Detrick tenants of NCI-FCRDC, USAMRIID, and USDA; to provide recommendations regarding the alternatives that have been identified in a Draft Feasibility Study and to identify any other feasible alternatives that should be considered; and to identify possible concerns and challenges from the public which Fort Detrick should anticipate when

implementing an alternative to the current Laboratory Sewer System (LSS) and Steam Sterilization Plant (SSP) operations.

4. Mr. Covert gave an overview of the mission and functions of Fort Detrick. The BAG members stressed the importance of ensuring all information provided to the public is accurate and can be justified.

5. Mr. Sheffer gave an overview of the LSS/SSP situation. The draft LSS information papers and attachments were individually discussed. There were numerous questions by the BAG members, and ail questions were addressed either by Mr. Sheffer or the meeting attendees. Various recommendations were made by the BAG members to clarify the information papers.

6. Dr. Bruckart provided an overview of USDA's Agriculture Research Service operations and research activities at Building 374. Dr. Bruckart emphasized that the SSP provides primary treatment for effluent from the containment areas (laboratories and greenhouses). He also emphasized that organisms in the containment areas are of potential risk to agriculture only, and not a risk to humans or animals.

7. COL Franz provided an overview of USAMRIID's operations and research activities.

8. At the SSP, Mr. Ed Chmelik used the SSP model to discuss the operation of the SSP. Mr. Chmelik emphasized that the SSP has many new components, the SSP is properly maintained, and that the SSP provides a backup to laboratory wastewater treatment.

9. Dr. Morin gave an overview of the NCI-FCRDC operations and research activities. It was emphasized that all laboratories are inspected twice per year for compliance with applicable regulations and policies, and that deficiencies are documented and tracked to completion; all potentially infectious liquid wastes are autoclaved or chemically disinfected before discharge into the sewer; and NCI-FCRDC has no regulatory requirement for the LSS or SSP.

10. The BAG adjourned at 1645 hours on 29 May, and reconvened at 0800 hrs on 30 May.

11. The BAG made the following key observations.

a. At USDA:

(1) Sterilization and decontamination practices are not set by regulation at this time. These matters are being considered for regulations. Import permits are issued based upon existing waste handling procedures.

(2) All solid waste from laboratory work is heat treated before leaving the building. Wastewater from the containment areas is discharged to the LSS and is not treated before leaving the building. It is heat treated at the SSP.

(3) None of the bacteria, viruses, or fungi are a risk to human health. They could be an economic risk to agriculture if inappropriately released. The laboratory operates as a BL-3 agriculture laboratory which takes these factors into consideration.

b. At NCI-FCRDC:

(1) The buildings currently occupied by the NCI-FCRDC were serviced by the LSS/SSP during the biological warfare research activities conducted at Fort Detrick prior to 1969. With the introduction of the NCI-FCRDC mission to Fort Detrick, no change was made to the LSS/SSP system. The activities taking place at NCI FCRDC are far different from those occurring prior to 1969.

(2) NCI-FCRDC does not work with BL-4 organisms.

(3) Wastes from BL-3 laboratories are heat or chemically treated prior to disposal, in accordance with (or exceeding) Centers for Disease Control and Prevention (CDC)/National Institutes of Health (NIH) Biosafety guidelines and Maryland Department of Environment Regulations. The SSP is not relied on to meet these requirements.

c. At USAMRIID:

(1) All laboratory wastewater is heat or chemically treated in accordance with (or exceeding) CDC/NIH Biosafety guidelines.
(2) BL-3 animal room wastewater which is not heat treated before discharge or disposal, is washed down floor drains and followed by a disinfectant specifically chosen for the organism(s) potentially present. This is in accordance with CDC/NIH Biosafety guidelines.
(3) BL-4 animal room wastewater which is not heat treated before discharge or disposal, is washed down floor drains and followed by a disinfectant specifically chosen for the organism(s) potentially present. This discharge still requires heat treatment, and this treatment is provided at the SSP.
(4) The current configuration at USAMRIID is such that wastewater discharge from BL- is connected with other areas wastewater discharge to the LSS.

12. The BAG provided the following recommendations regarding the need for the SSP, or an alternate treatment facility, for treatment of laboratory wastewater from USDA, USAMRIID and NCI-FCRDC.

a. For USDA, the SSP (or an alternative heat treatment facility) is required because:

(1) USDA uses heat treatment at the SSP as the primary treatment of wastewater from Building 374 containment areas (laboratories and greenhouses).
(2) USDA *permits* for work in Building 374 allow work with exotic plants, microorganisms and materials, provided wastewater from laboratory operations is treated before disposal.
(3) The SSP satisfies the proposed Animal and Plant Health Inspection Service (APHIS) regulation which would require heat treatment of Building 374 containment area wastewater.

b. For USAMRIID, the SSP (or an alternative heat treatment facility) is required because:

(1) U.S. Army and Federal regulations (Department of Army Pamphlet 385-69 and Title 32 Code of Federal Regulations Part 626) stipulate that wastewater generated by research conducted in BL 4 containment laboratories requires secondary heat treatment before entering the sanitary sewer system.

c. For NCI-FCRDC, the SSP is not required because:

(1) There are no BL-4 containment facilities, BL-4 agents, or large quantities of BL-3 agents which require maximum containment and wastewater treatment over and above treatment which is currently accomplished in the individual laboratories or laboratory buildings.

(2) Pathogens/organisms, and practices used are typical of those of other cancer research centers. Agents are classified for use at the BL-3 level, or lower. There is no regulatory requirement for secondary heat treatment of wastewater from B L-3 laboratories.

(3) Only laboratory scale fermentation is conducted. Large scale fermentation, i.e., greater that ten liters, is limited to BL-1 and BL-2 organisms.

(4) NCI-FCRDC occupies buildings used previously in biological warfare research conducted prior to 1969. The LSS connections were an integral part of these building systems. The LSS connections were kept in place although the SSP was not required for treatment of wastewater generated by NCI-FCRDC activities.

(5) Wastewater originating from NCI-FCRDC research activities involving non- exotic plant materials does not require treatment at the SSP.

13. The BAG provided recommendations regarding the alternatives that have been identified in a Draft Feasibility Study. Their recommendations are based primarily on two baseline factors. The first factor is that NCI-FCRDC does not require the LSS/SSP or an alternative treatment facility, and the second factor is that any needed wastewater treatment should be provided as close to the source of the wastewater generation as possible. In addition the BAG's recommendations are based on safety and potential risk, without consideration of cost and public perception. The BAG's rank order prioritization of alternatives is:

a. Number 1 and 1a are alternatives C1 and C2 from the Draft Feasibility Study. The alternatives include discontinuing SSP operation, installing new treatment facilities for USDA and USAMRIID, and discharging NCI-FCRDC wastewater and wastewater from the new treatment facilities either directly to the sanitary sewer or to a decontaminated LSS which would act as a sanitary sewer.

b. Number 2 is alternative C6 which includes continued but reduced SSP operation, NCI wastewater rerouted to the sanitary sewer, and new double wall pipe from USAMRIID and USDA to the SSP to continue to treat their wastewater at the SSP.

c. Number 3 and 3a are alternatives B3 and B4 which include continued but reduced SSP operation, NCI-FCRDC wastewater rerouted to the sanitary sewer, and continued use of the existing LSS with LSS condition monitoring and LSS replacement as required. Alternatives B3 and B4 provide an acceptable solution to the LSS/SSP project. In addition it is fully recognized by the BAG that current LSS and SSP operating conditions may continue for several years before a corrective action alternative is fully implemented.

The BAG recommended that additional consideration be given to not continuing to treat USAMRIID's non BL-4 wastewater at the SSP or an alternative treatment facility.

14. The BAG indicated that major public affairs challenges should be anticipated if the SSP is shut down or wastewater is diverted from the SSP. Close and immediate coordination with County and City Public Health Officials, community leaders, and appropriate State offices was strongly recommended. Consideration should be given to informing community organizations such as the Kiwanis and Rotary clubs. Consideration should be given to involving the Restoration Advisory Board and the NCI-FCRDC Institutional Biosafety Committee. Strong resistance from environmental groups such as the Sierra Club, the Natural Resources Defense Council, etc., should be expected. Employee resistance should be expected.

15. The BAG also provided the following recommendations:

a. It is recommended that announcements to the public stress that Fort Detrick is implementing an "improved" system for safe treatment of wastewater. It is important for the public to understand that the "olds" system served Fort Detrick and the community well for many years, and the system is being updated to a more efficient but safe alternative.

b. It is strongly recommended that the U.S. Army Center for Health Promotion and Preventive Medicine not conduct off post testing for indications of LSS leaks at this time.

c. It is recommended that based on the information provided, emergency repairs of the LSS are not required since the current condition of the LSS does not represent an imminent health hazard or immediate risk to the public, employees or the environment. It is acceptable to continue to use the existing LSS until a corrective action alternative is implemented in the near future.

16. The BAG members indicated they are available for continued support to the LSS project. The BAG meeting adjourned at 1330 hrs.

ENVIRONMENTAL ASSESSMENT FOR CONSTRUCTION OF TWO STERILIZATION FACILITIES, CONVERSION AND ABANDONMENT OF THE LABORATORY SEWER SYSTEM, AND DEACTIVATION OF THE STEAM STERILIZATION PLANT
UNITED STATES ARMY GARRISON, FORT DETRICK, MARYLAND

Concur:

ORIGINAL SIGNED

____
Mr. Manuel S. Barbeito, BAG Member

ORIGINAL SIGNED

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Dr. Emmett Barkley, BAG Member

ORIGINAL SIGNED

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Mr. Ralph Kuehne, BAG Member

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Dr. Robert McKinney, BAG Member

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Mr. Joseph Songer, BAG Member

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Dr. Jerry J. Tulis, BAG Member

ORIGINAL SIGNED

ALAN W. SHEAFFER
LTC, MS
Director of Safety
and Environment

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APPENDIX L

LSS Alternatives

1. Purpose: To provide information regarding LSS alternatives: Overview of alternatives to resolve the LSS situation.

2. Facts:

a. The U.S. Army Center for Public Works awarded a contract to a consultant on 11 August 1995 to identify and evaluate LSS/SSP alternatives, and conduct an analysis of the LSS study. The contract amount was $92K. On 9 November 1995, the consultant (RASCO) provided a briefing to Ft. Detrick and tenant representatives regarding feasible alternatives to the existing LSS and SSP operations. On 15 November, Ft. Detrick selected seven alternatives for the consultant to further investigate and to conduct Life Cycle Cost Analysis on. The consultant's draft report was received 18 March 1996, and distributed to the LSS working group for review and comment. Written comments were provided to the consultant on 18 April. Ft. Detrick received the final report on 14 June 1996. A chart which identifies the conditions and costs associated with the seven alternatives is attached.

Rod Sheffer
Environmental Engineer
MCHD-SHE
August 15, 1996

Alternatives selected for RASCO Cost Analysis
and
Final RASCO Rank Order of Alternatives Based on Cost

	Alternatives Selected						
	C6	**B4**	**B3**	**C1**	**C2**	**A2**	**A3**
RASCO Draft Rank Order	1	2	3	4	5	6	7
RASCO Draft Report Alternative ID#	7	4	3	5	6	1	2
SSP OPERATION							
Continue current SSP operations	-	-	-	-	-	✓	✓
Reduced SSP operation, SSP operational changes (one 8 hour shift per 24 hours)	-	-	✓	-	-	-	-
Reduced SSP operation, SSP operational and physical changes (deactivate one sterilization unit)(one 8 hour shift per 24 hours)	✓	✓	-	-	-	-	-
Discontinue SSP operation	-	-	-	✓	✓	-	-
NCI FLOW							
Treat NCI flow @ SSP	-	-	-	-	-	✓	✓
Reroute all NCI flow to sanitary sewer. (1) Monitor flow.	✓	✓	✓	✓	✓	-	-
USAMRIID/USDA FLOW							
Treat USDA/USAMRIID flow @ SSP	✓	✓	✓	-	-	✓	✓
Treat USDA/USAMRIID flow at new local treatment facilities (Double wall pipe to facilities)	-	-	-	✓	✓	-	-
LSS DISPOSITION							
Repair or replace existing LSS where required.	-	✓	✓	✓	-	✓	✓
Install lysimeters, testing of soil and groundwater, survey and repair cleanouts.	-	✓	✓	-	-	-	✓
Investigate potentially leaking and untested areas of LSS. Repair or replace with double wall pipe with leak detection.(3)	-	✓(2)	✓(2)	-	-	✓	✓
Decontaminate LSS, & discharge USAMRIID, NCI, and USDA flow to decontaminated LSS.	-	-	-	✓	-	-	-
Deactivate LSS/SSP and discharge wastewater from NCI, and from USDA and USAMRIID local treatment plants to the sanitary sewer.	-	-	-	-	✓	-	-
New double wall pipe with leak detection from USDA/USAMRIID to the SSP.	✓	-	-	-	-	-	-
COST							
Net Present Value. ($1,000,000)	10.5	10.6	11.5	16.4	16.5	20.4	21.2
Equivalence Uniform Annual Cost. ($1,000,000)	.68	.69	.74	1.06	1.07	1.32	1.37

(1) NCI discharge to sanitary sewer either directly, or to portions of deactivated/decontaminated LSS, install flowmeters on NCI new discharge to sanitary sewer. Decontaminate and abandon portions of LSS not needed.

(2) Portions of the current LSS no longer used for LSS/SSP treatment (dedicated NCI LSS lines) may not need further investigation or repair.

(3) Groundwater and LSS dye tracer studies, video surveys, SF-6 studies, hydrostatic testing of the LSS.

RSS August 15, 1996

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APPENDIX M

LSS Management to Date

1. Purpose: To provide information regarding LSS management actions taken: What has happened since the report has been finalized. Committees, action plans, command interest, etc.

2. Facts:

a. Committees

(1.) The LSS was discussed at the SOFIE SIT meetings on 12 April and 24 May 1995.

(2.) A Fort Detrick LSS working group consists of representatives from DSE, DPW, IH, NCI, USAMRIID, and USDA. The working group meets on a regular basis.

(3.) The Fort Detrick Executive Steering Committee was briefed on the LSS situation on 10 May 1996 and 8 July 1996.

b. Action Plans

(1.) Various action plans and flow diagrams were developed in the October 1994 through March 1995 time frame.

(2.) The LSS project has been added to the Fort Detrick business plan.

(3.) A LSS/SSP flowchart was prepared by the Fort Detrick DSE in March 1996.

c. Command Interest

(1.) The LSS project was discussed with the MEDCOM Environmental Office during the April 1995 ECAS inspection, and on various other occasions.

(2.) The AEC Program Manager for the Fort Detrick IRP program has been provided information on the LSS.

(3.) CHPPM services have been requested through MEDCOM. CHPPM assistance is in progress.

(4.) The U.S. Army Center for Public Works has awarded a contract to a consultant for $90K to evaluate LSS feasible alternatives and the LSS survey. The final report was received in June 1996.

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Environmental Engineer
MCHD-SHE
August 15, 1996

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APPENDIX N

Alternate Treatment Technology

1. Purpose: To provide information regarding existing or planned laboratory wastewater treatment systems, and to provide information on alternate treatment technologies.

2. Facts:

a. The design of a U.S. Army Dugway Proving Ground project includes two stainless steel 1110 gallon tanks for treatment of BL-3 wastewater prior to discharge to the sanitary sewer. The system is designed for an estimated wastewater flow of 450 GPD, and retention time of not less than one hour at 250 degrees F. The system is designed for manual operation to minimize the possibility of untreated discharge to the sanitary system. The design requires stainless steel pipe with welded connections. Tanks are designed to be in a curbed area with leak detection. Pipe vents are to contain HEPA filters. Sanitary sewage and wastewater from BL-1 and BL-2 laboratories will discharge directly to the sanitary sewer. The cost of the BL-3 treatment facility is included in the $5M laboratory project cost. Design information is attached to the 31 May 95 DSE trip report. There are no existing BL-4 laboratories at Dugway, and there are no plans for BL-4 laboratories. In late 1995 and early 1996, the need for the wastewater treatment facility was reconsidered, and the treatment facility was deleted from the laboratory construction project. Treated wastewater from the BL-3 laboratories will be discharged directly to the sanitary sewer system.

b. USDA's Plum Island, New York system was designed with Fort Detrick's assistance. Their system consists of less than one mile of exterior steel collection lines which discharge to a Decon Plant. The lines have a tar coating and welded connections, and do not have concrete encasement. The Decon Plant treats BL-3 wastewater only (no BL-4) The Decon Plant has two separate systems, a continuous flow system and a batch system. Both systems can operate simultaneously. The continuous flow system operates at 40 gallons a minute at 215 degrees F. It runs approximately 20 hours per day. There are duplicate continuous flow units to allow one of the units to go down for maintenance. Normally the effluent from the continuous system flows into the second system, the batch system. The batch system consists of three 30,000 gallon storage tanks used for batch processing. If both continuous flow units are down, the wastewater is treated in the batch system only. Once a week (whether these tanks are full or empty) the batch system is activated to 212-215 degrees F. In addition to these three tanks, there are two receiving tanks with a capacity of 10,000 gallons each. These are generally bypassed unless they are needed to store influent temporarily. Wastewater is discharged from the Decon Plant to their sanitary sewer system, and discharged per an NPDES Permit.

c. National Animal Disease Center (NADC) in Ames, Iowa has BL-3 animal labs. Their treatment system has four treatment tanks, each with a capacity of 2000 gallons used for batch sterilization at 250 degrees F for 30 minutes. The facility has 3 storage tanks, each of which has a capacity of 5000 gallons. There is one heat exchanger which is used to lower the temperature to 150 degrees F prior to discharging.

d. Centers for Disease Control and Prevention (CDC) has wastewater treatment system for their two BL-4 labs. The system has two 1000 gallon "steam jacket" tanks designed to treat up to 5000 gallons per day. The system began operation in 1990. The system was designed to be automatic, however it is now operated manually 24 hours per day, due to numerous maintenance problems. The tanks receive approximately 50 gallons of wastewater per day. The wastewater is heated for two hours at 270 degrees F. Wastewater is then cooled to 150 degrees F before discharge to the sanitary sewer. Treated wastewater from BL-3 laboratories is also discharged to the sanitary sewer. The sanitary sewer system is owned by the county. The county does not require CDC to conduct biological analysis of wastewater discharged to the county sewer system. Analysis for pH is required.

e. Agriculture Canada Health and Welfare Service is building a new laboratory operation that will have to dispose of wastewater from BL-3 and BL-4 laboratories. The laboratory is being built in Winnipeg and requires four treatment units. Each treatment unit contains a 5000 liter sterilization tank. Three tanks are for liquids, and one is for solids (animal parts). Tanks contain paddles for agitation, and the tanks and paddles have steam inside of them. The system was manufactured in Toronto by KSI. Each treatment unit cost approximately $350K, and with controls and piping could exceed $500K per unit. September 1995 drawings of the treatment units have been received. In July 1993 a consultant completed an analysis of the waste stream for this facility, and analyzed alternative treatment technologies. Treatment technologies analyzed include incineration, plasma arc, pyrolysis, thermal inactivation, chemical disinfection, microwave disinfection, and irradiation.

f. The NCI recently installed a heat sterilization system in Bldg. 459 on Fort Detrick. The renovation of the NCI Building 459 (Monoclonal Antibody Recombinant Production Facility) included the installation of two 150 gallon "Kill tanks" and a 300 gallon cooling tank, and associated piping, filters, controls, filters, etc. The system was designed to treat an average flow of 150 GPD, and a peak flow of 720 gallons in a six hour period. The maximum design flow is 4800 GPD. The total cost of the treatment system was $250,000. The system was designed to decontaminate process wastewater prior to discharge into the LSS. Although there is no environmental or safety regulatory requirement for this treatment, the FDA Current Good Manufacturing Practices requires a waste treatment system.

g. A BL-4 research facility at the National Institutes of Health in Bethesda, MD, is currently being renovated, and a new wastewater processing system is being installed. The system consists of two 800 gallon stainless steel vertical tanks with both steam injection and steam jacket heating. The vertical tanks were selected due to NIH’s desire to avoid heat stratification problems. After heating in these tanks, the wastewater will discharge to two cooling tanks where it will be cooled to 120 degrees F. Wastewater then flows to a neutralization tank where the pH is adjusted to 6 to 10 prior to discharge to the sanitary sewer. The sanitary sewer system is owned by the Washington Suburban Sanitary Commission.

h. Two chemical wastewater treatment systems are currently in use at Duke University in Durham, NC. Both of the systems were constructed for treatment of wastewater from BL-3 laboratories. Use for BL-4 wastewater treatment is not anticipated. The first system was installed in 1980 and originally utilized chlorine gas to treat the wastewater. Due to safety concerns of using the gas, the system was switched to using a 15% sodium hypochlorite solution. The system consists of two 1900 gallon buried concrete tanks with associated piping, controls etc. The first tank acts as a storage tank and when the wastewater reaches a certain level it is transferred to the second tank where the wastewater is chlorinated and agitated.

After this treatment process is completed the wastewater is discharged to the sanitary sewer. Wastewater is discharged to the sanitary sewer and is tested weekly for pH and monthly for specific organisms to ensure no viable organisms are discharged. The system treats an average flow of several hundred gallons per day.

A second treatment system was constructed in 1986 and treats wastewater from the Aids Research Laboratories. The system is basically the same as the above system, however the tanks are two 1000 gallon fiberglass tanks. The tanks are below ground, but they are accessible (not direct burial). The system treats an average flow of several hundred gallons per day.

i. The May 1986 EPA Guide for Infectious Waste Management, describes various treatment technologies for liquid infectious waste. Technologies discussed are steam sterilization, incineration, thermal inactivation, gas/vapor sterilization, chemical disinfection, and sterilization by irradiation.

j. A 1995 study by the National Institutes of Health provides information from vendors of treatment systems for medical laboratory and pathological waste. Vendor information is provided on various chemical, thermal and irradiation treatment technologies.

k. The March 1991 Ft. Detrick Design Criteria provides information on batch sterilization, pasteurization, and continuous flow sterilization wastewater treatment systems. Design criteria and schematic sketches are provided. Appendix A provides information on microbial decontamination methods.

l. Appendix I of the Engineering and Economic Feasibility Study of the LSS and the SSP, June 1996, provides a description of various thermal, chemical, electromagnetic wave, and bioremediation treatment technologies. Points of contact relating to alternative technologies are also provided.

m. In April of 1996 DSE staff received abstracts of presentations given at American Biological Safety Association conferences regarding treatment of medical and liquid infectious waste.

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APPENDIX O

NEPA Requirements

1. Purpose: To provide information regarding the NEPA requirements: Identify NEPA documentation that includes information on the LSS or SSP. **Identify NEPA documentation** that may be required.

2. Facts:

a. The Fort Detrick Installation Environmental Assessment, February 1991, indicates that wastewater emanating from most of the biological laboratories of the various tenants is considered potentially contaminated and is collected separately by a sterilized sewer system. The assessment indicates that for USAMRIID, laboratory wastewater is decontaminated or chemically inactivated prior to being discharged to the LSS. For USDA the assessment indicates that liquid waste from the Building 374 containment area drains to the steam sterilization facility. For NCI the assessment indicates that liquid effluent from laboratory buildings drains to the steam sterilization facility.

b. The 1991 USAMRIID Environmental Assessment and the 1989 Biological Defense Research Program Environmental Impact Statement indicate that wastewater from USAMRIID laboratories is discharged into the LSS and treated at the SSP.

c. Routine maintenance and repair of the LSS and the SSP is covered under the Fort Detrick Installation Environmental Assessment dated February 1991.

d. A record of environmental consideration was completed for the LSS leak investigation under categorical exclusion A-5 in AR 200-2 (June 1993).

e. Appropriate environmental documentation will be prepared before the NCI diverts wastewater from the LSS to the sanitary sewer, or if the SSP is shut down.

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APPENDIX P

Clean Water Act (CWA) Requirements

1. Purpose: To provide information regarding Clean Water Act (CWA) requirements: Identify the impacts of the National Pollutant Discharge Elimination System (NPDES), Federal Facilities Compliance Act (FFCA), and Pretreatment Regulations on continuing operation or discontinuing operation of the SSP.

2. Facts:

a. There are no CWA impacts as long as NPDES permit compliance is maintained. In April 1995 a CHPPM ECAS inspection team was briefed on the LSS situation, and there were no LSS or SSP ECAS findings. There are no FFCA or Pretreatment Regulation impacts.

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APPENDIX Q

Regulatory History

1. Purpose: To provide the regulatory history of the LSS situation.

2. Facts:

a. A copy of the LSS study was provided to the State of MD Department of Environment on 18 May 1995.

b. No significant groundwater testing has been done in the LSS area. However, CHPPM installed four wells in November 1995 for groundwater monitoring adjacent to the LSS. Results of CHPPM groundwater testing are provided in the April 1996 draft Health Risk Evaluation. Additional groundwater testing was conducted by CHPPM in July 1996.

c. The DSE met with the MDE on 25 August 1995 regarding the dewatering well adjacent to the LSS and east of Building 350. In a letter dated 22 September 1995, the DSE provided additional details on the dewatering well and Fort Detrick's intention to discharge the effluent to the sanitary sewer system.

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APPENDIX R

Public Perception

1. Purpose: To provide information regarding the publics perception of the LSS situation. Provide information on the public's perception to date. Provide information on press releases which have occurred.

2. Facts:

a. Press Releases:

(1.) 14 May 1995 Washington Post: Overview of the LSS study and corrective action being taken.

(2.) 14 May 1995 Hagerstown Herald Mail: Overview of the LSS study and corrective action being taken.

(3.) 13 May 1995 Frederick News Post: Overview of the LSS study and corrective action being taken.

(4.) At least one TV news channel (channel 4, Wash, DC) had a 5 minute presentation on the LSS situation (John Le. 9 June 1995).

(5.) Fox television (Steve Sentoni) has been requesting information regarding the LSS from PAO.

(6.) 10 August 1995 Gettysburg Times: Overview of the LSS and CHPPM and CPW efforts.

(7.) 10 August 1995 Hagerstown Morning Herald: Overview of the LSS and CHPPM and CPW efforts.

(8.) 10 August 1995 Frederick Post: General information on the LSS and efforts by CPW and CHPPM.

(9.) 12 August 1995 Frederick Post: General information on the SSP. NCI comments that the SSP is unnecessary for their operations.

(10.) 21 September 1995 Ft. Detrick Standard: Information on the LSS and studies by the CPW Consultant and CHPPM.

b. An AP reporter has a copy of the LSS final report (23 June 1995).

c. A 4 August 1995 memo from Fort Detrick's Chief of Staff requires:

(1.) DSE and DIS to:

(a.) Encourage PAO attendance in LSS meetings.

(b.) Provide meeting minutes and background information to PAO.

(c.) Assist PAO to develop a public affairs plan and information briefing.

(2.) PAO will:

(a.) Develop a public affairs plan.

(b) Develop a LSS briefing.

(c.) Coordinate LSS information with DSE and DIS prior to release to public.

d. A Public Affairs Plan has been prepared and is dated 2 July 1996.

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APPENDIX S

Other DoD/Government Agency Involvement

1. Purpose: To provide information regarding other DoD/Government agency involvement/input.

2. Facts:

a. In May 1995 the Fort Detrick Director of Safety and Environment visited the Centers for Disease Control and Prevention in Atlanta, and Dugway Proving Grounds, Utah. His trip report dated 31 May 1995, provides information on laboratory wastewater treatment processes in use at these facilities.

b. POC's have been established at CDC, USDA Plum Island, National Animal Disease Center, and the Canadian Health and Welfare Service. Information on wastewater treatment processes at their facilities has been received and is provided in Appendix N.

c. In October 1995 Fort Detrick responded to Congressman Bartlett's request for information on the LSS/SSP situation. This response was made due to the Congressman's letter dated 18 September 1995 seeking information on Ft. Detrick's plans for the SSP and the LSS, and the employment status of employees of that facility.

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APPENDIX T

Other Significant Issues To Address

1. Purpose: Identify and discuss other issues.

2. Facts:

a. Fund availability/eligibility

(1.) Maintenance and repair, construction, and equipment funds for complete replacement of the LSS and the SSP (or installing individual treatment facilities at various locations), may not be available. Who will fund the projects will have to be determined. Work classification issues (maintenance and repair vs construction vs equipment) will have to be resolved.

(2.) DERA funds are a potential fund source if the LSS is abandoned and cleanup of chemical contamination at the LSS is required. Funding, if available would be limited to restoration, investigation, and clean up.

(3.) NCI might pay for part of the study to investigate removal of NCI from the SSP.

(4.) Environmental funds are officially called Environmental Compliance Achievement Program Funds. The purpose of these funds is to achieve environmental compliance. There is no regulating force over the laboratory sewer system, other than what would be required for a normal sanitary sewer system. That is, as far as ECAP is concerned, the LSS is no different than an ordinary sewer. Repair and maintenance of sewers is a normal Real Property Maintenance Account function. Guidance is clear that ECAP should not be used for maintenance.

b. The NCI Building 459 has a wastewater batch heat treatment system in the basement. The sterilization unit is similar to a blowcase but very modernized and automated. The need for the system is related to the fact that the facility is to be certified/validated in accordance with FDA pharmaceutical current good manufacturing practices. The system will process production waste before discharging to the LSS.

c. LSS under buildings were not evaluated during the LSS survey. The LSS pressure line, to the above ground tanks was not evaluated. LSS return lines from the above ground tanks were not evaluated. These lines were replaced in 1991.

d. A Bio-Assessment Advisory Group (BAG) meeting was held 9 June 1989 and minutes are dated 31 July 1989. The BAG Group was formed at the request of the USAG Safety Division to get a professional unbiased opinion of how the SSP was being operated, how samples were being analyzed, and whether or not there was a genuine need for the SSP.

e. A U.S. Army Audit Agency Report of Toxic and Hazardous Materials and Wastes at Fort Detrick dated 23 April 1990 identified deficiencies in how test results of the SSP effluent were used. The report found that samples which showed bacterial presence in treated SSP effluent were not investigated to determine the reason for, and origin or type of bacteria causing the nonsterile condition. Fort Detrick indicated their belief that the condition was caused by migration of bacteria from the sanitary sewer system. In addition, the testing method was changed to "COLILERT," and an SOP dated April 1992 was developed for testing the SSP effluent.

f. A U.S. Army Audit Agency Report of Storage and Disposal of Hazardous Materials at Fort Detrick is dated 23 February 1984. The report recommends that SSP effluent monitoring procedures be improved, that procedures to monitor SSP processor temperatures be improved, that SSP automatic shutoff valves be installed, and that a plan be developed to calibrate SSP instrumentation. The report identifies corrective actions taken or planned. A U.S. Army Audit Agency Advisory Report on Toxic and Hazardous Materials and Wastes at Fort Detrick, dated 22 March 1985, recaps the above findings, and provides a checklist for Commanders to use to evaluate similar sterilization processes.

g. A 1980 AEHA Wastewater Engineering Survey had no negative findings regarding the SSP or LSS. A 1991 AEHA Water Quality Consultation provides a general overview of the SSP operation, and recommends changes be made to the effluent sampling process. A April 1992 SOP identifies procedures for testing the SSP effluent using the COLILERT method.

h. NCI Building 1023 discharges treated wastewater from a BL-3 laboratory operation directly to the sanitary sewer. NCI indicates that all biological wastes generated in Building 1023 are decontaminated consistent with NCI policy, and this treatment satisfies all current CDC/NIH requirements for the disposal of biological wastes from a BL-3 laboratory.

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APPENDIX U

Hurdles/Challenge

1. Purpose: Identify issues that could possibly lead to elimination of all alternatives that do not include continued operation of the SSP.

2. Issues:

a. NEPA requirements leading to negative public affairs:

b. NPDES requirements: (believed to have no impact.)

c. Pretreatment requirements: (believed to have no impact.)

d. Chesapeake Bay initiative: (believed to have no impact.)

e. Federal Facilities Compliance Act: (believed to have no impact.)

f. Environmental Group pressure: NRDC, potential lawsuits

g. Employee Union resistance:

h. Inability or unwillingness of tenants to characterize wastewater:

i. Sanitary wastewater treatment plant privatization:

j. Clean Water Act antibacksliding requirements: (believed to have no impact.)

k. Public pressure/perception:

1. Cost/benefit analysis:

m. Future wastewater treatment requirements:
(1.) Inability to identify tenants mission changes.

(2.) Inability to define the value/need of maintaining a unique treatment system with significant standby capacity (Readiness and Base Closure impacts.)

n. Inability to state that the level of safety and environmental protection provided by the existing SSP would be equaled or exceeded with alternative treatment systems.

o. Unavailability of funds to install new treatment systems at buildings.

p. Command pressure:

q. Other agendas:

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